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## Indian Rocks Beach Experiment January-March 2003

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JANUARY - MARCH 2003  
NRL MEMORANDUM REPORT**

16 January 2004

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## 1.0 INTRODUCTION

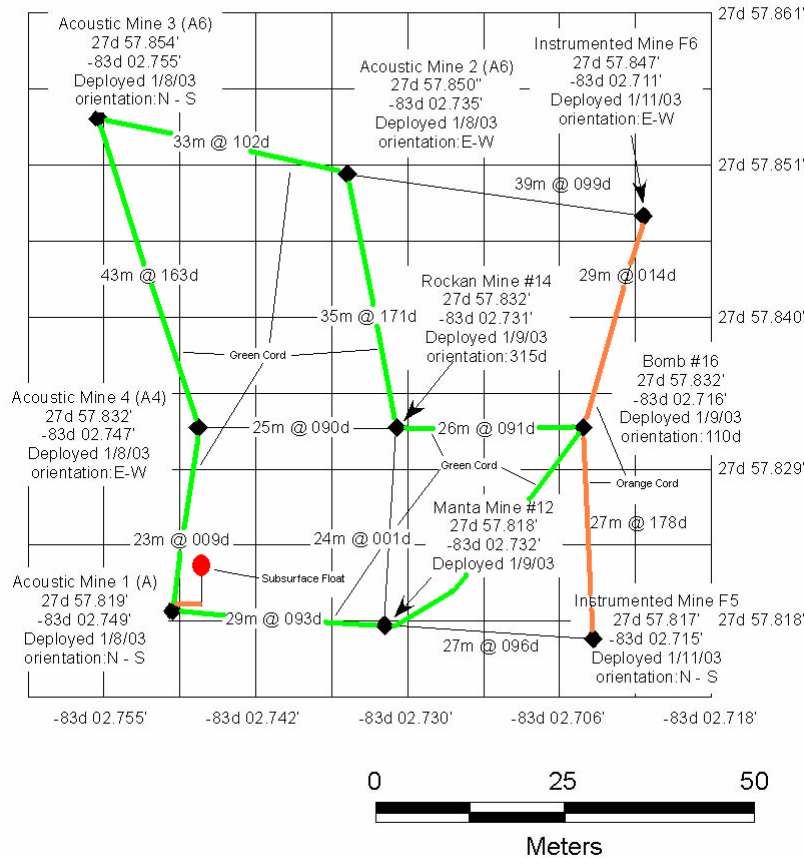
An experiment in support of the ONR/NRL Mine Burial Prediction program was conducted in the Winter of 2003 at the Indian Rocks Beach (IRB) site (off Tampa Bay, Florida). This site had been well surveyed and documented by scientist from the University of South Florida during the previous year. NRL deployed and recovered 16 instrumented mines and mine shapes, made observations and collected sediment samples at each mine/mine shape. This report will document the general outline of the experiment, the initial observations and other preliminary data.

### 1.1 DESCRIPTION OF THE INDIAN ROCKS BEACH WINTER 2003 EXPERIMENT

Briefly, the NRL field work for the IRB Winter 2003 experiment involved deployment and visual inspection of 16 different mines and mine shapes at three different sites and collection of sediment samples for laboratory analysis. At the primary location, site 1 (with fine sand sediments - see figure 1) we deployed 9 mines/mine shapes (4 Acoustic Instrumented Mines (AIMS, numbers 1, 2, 3, & 4); one each Rockan shape (number 14), Manta shape (number 12), and 500-lb-Bomb shape (number 16); and 2 Forschungsanstalt der Bundeswehr für Wasserschall- und Geophysik (FWG) Instrumented Mines (numbers 5 & 6)). At site 2 (with coarse sand sediment - see figure 2) we deployed 5 mine/mine shapes (one each Rockan shape (number 13), Manta shape (number 11), and 500-lb-Bomb shape (number 15); and 2 FWG Instrumented Mines (numbers 7 & 8)). At Site 3 (with fine sand sediment - see figure 3) we deployed 2 FWG Instrumented Mines (numbers 9 & 10). Figure 4 provides an overview of the experiment layout and relationship between the sites. Appendix 1 provides the deployed location of each mine/mine shape. Table 1 provides the exact deployment time (on the seafloor) as well as recovery time for each shape.

# ONR Indian Rocks Beach Deployments in Fine Sediments, Shallow Water

(Deployed January 8, 9 & 11, 2003)



note: 10 meter grid, subsurface bouy on Acoustic Mine 1 (A)

Figure 1. Site 1 is the primary deployment location (with fine sand): where all 4 Acoustic Instrumented Mines (AIMS #s 1, 2, 3, & 4), one each Rockan shape (# 14), Manta shape (# 12), and 500-lb-Bomb shape (# 16), and 2 FWG Instrumented Mines (#s 5 & 6). The colored lines represent the color and location of the parachute cord installed by the divers to aid in relocating the mines and mine shapes.

(Figure provided by Brian Donahue/USF)

# ONR Indian Rocks Beach Deployments in Coarse Sediments

(Deployed January 9 & 11, 2003)

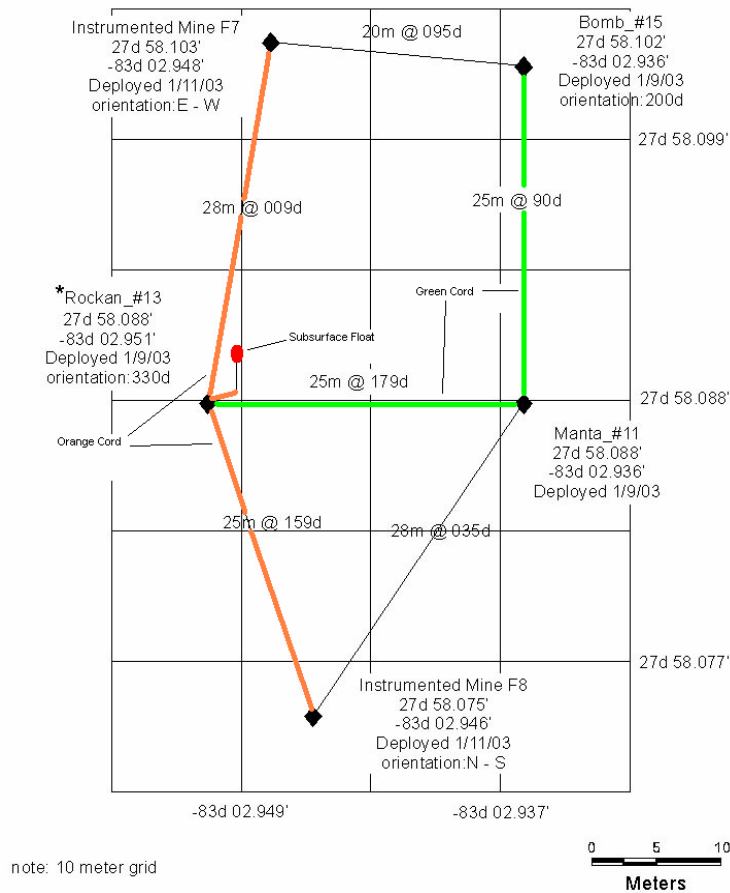
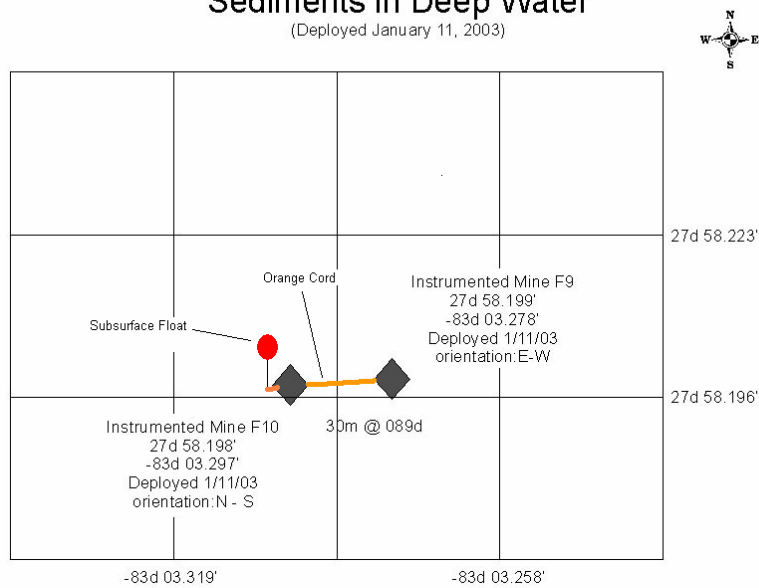


Figure 2. Site 2 is the secondary location (with coarse sand) where one each Rockan shape (# 13), Manta shape (# 11), and 500-lb-Bomb shape (# 15); and 2 FWG Instrumented Mines (#s 7 & 8) were deployed. The colored lines represent the color and location of the parachute cord installed by the divers to aid in relocating the mines and mine shapes.  
(Figure provided by Brian Donahue/USF)



# ONR Indian Rocks Beach Deployments in Fine Sediments in Deep Water

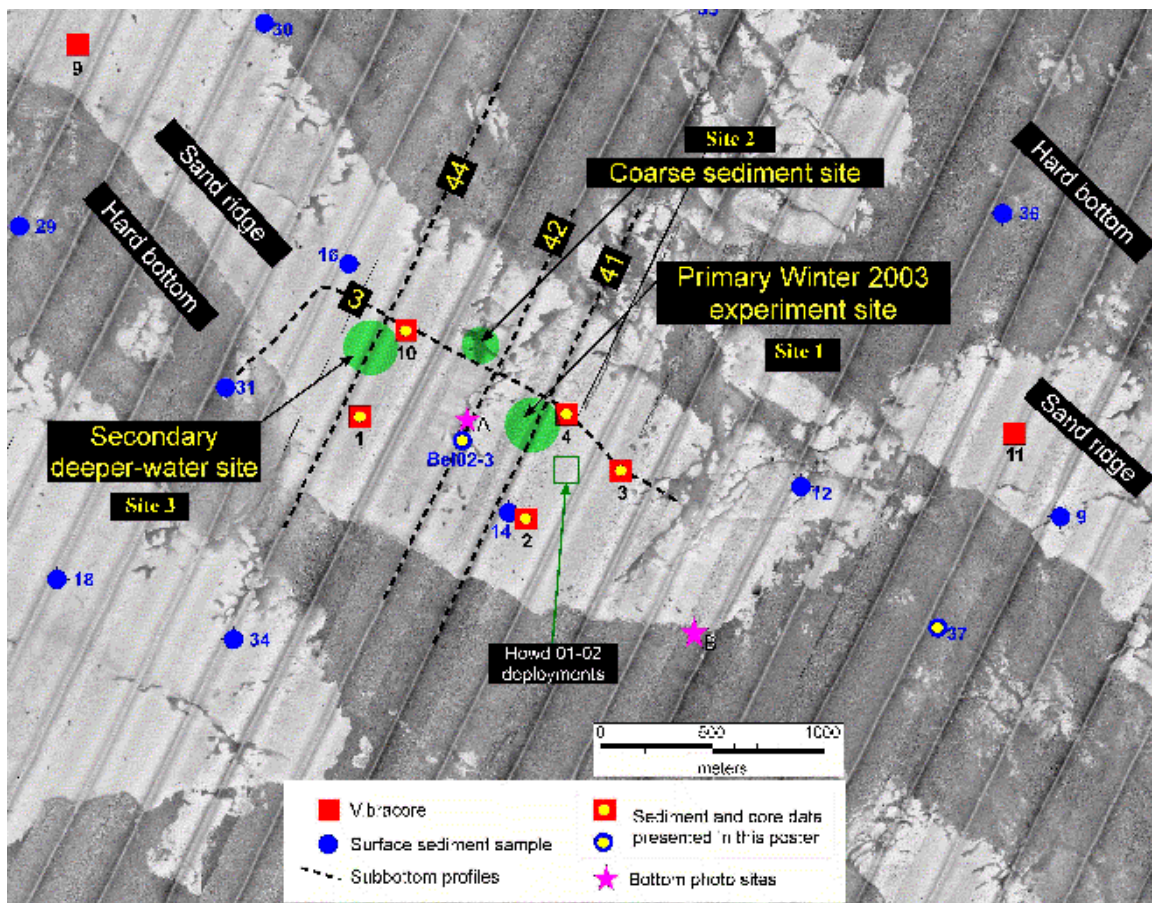
(Deployed January 11, 2003)



\* 50 Meter grid spacing

Figure 3. Site 3 (with fine sand) where 2 FWG Instrumented Mines (#s 9 & 10) were deployed. The colored lines represent the color and location of the parachute cord installed by the divers to aid in relocating the mines and mine shapes.

(Figure provided by Brian Donahue/USF)



The site selected for the Winter 2003 mine scour and burial experiments is located in 12-15 m water depth. Green dots indicate approximate locations of sensor deployments. High backscatter is dark (100 kHz side scan data).

Figure 4. Overall view of the Experiment Site.  
(Figure provided by USF)

Table 1. Time deployed and recovered for each mine/mine shape. Note that each of the AIMS were held about mid-depth in the water column for 35 minutes during the deployment and again during recovery to allow for one recording cycle to occur, ensuring no blockage of the depth sensors. All times were local (EST).

<b>Mine/Mine Shape</b>	<b>Deployed Date/Time on Bottom</b>	<b>Repositioned Date/Time</b>	<b>Recovered Date/Time on Surface</b>
AIM #1	8 Jan 03/1205	8 Jan 03/1400-1600	14 Mar 03/1637
AIM #2	8 Jan 03/1337	8 Jan 03/1400-1600	14 Mar 03/1415
AIM #3	8 Jan 03/0950	8 Jan 03/1400-1600	14 Mar 03/1505
AIM #4	8 Jan 03/1100	8 Jan 03/1400-1600	14 Mar 03/1547
FWG #5	11 Jan 03/1850	left as found	15 Mar 03/1305
FWG #6	11 Jan 03/1835	left as found	15 Mar 03/1130
FWG #7	11 Jan 03/1820	12 Jan 03/1430-1500	16 Mar 03/1250
FWG #8	11 Jan 03/1805	left as found	16 Mar 03/1240
FWG #9	11 Jan 03/1729	13 Jan 03/0900-0945	15 Mar 03/1704
FWG #10	11 Jan 03/1710	13 Jan 03/0900-0945	15 Mar 03/1730
Manta #11	9 Jan 03/0950	n/a	16 Mar 03/1223
Manta #12	9 Jan 03/0852	n/a	15 Mar 03/1330
Rockan #13	9 Jan 03/0932	n/a	16 Mar 03/1215
Rockan #14	9 Jan 03/0835	n/a	15 Mar 03/1030
Bomb #15	9 Jan 03/1320	n/a	16 Mar 03/1230
Bomb #16	9 Jan 03/1300	n/a	15 Mar 03/1050

## 1.2 DESCRIPTION OF THE MINE/MINE SHAPES USED FOR THE INDIAN ROCKS BEACH WINTER 2003 EXPERIMENT

Table 2 lists the 16 mine/mine shapes used for this experiment—note that the mine number was prominently displayed on each of the shapes. Appendix 1 provides the physical characteristics of each mine/mine shape.

Table 2. List of mine/mine shapes deployed by NRL during the IRB Winter 2003 Experiment.

Shape #	Mine/Mine Shape	Notes
1	AIM 1	No Backscatter, No Doppler
2	AIM 2	500-kHz Doppler
3	AIM 3	3- & 1.5-MHz Backscatter, 500-kHz
4	AIM 4	3- & 1.5-MHz Backscatter, 1.5-MHz
5	FWG's Instrumented	Optic buried sensors
6	FWG's Instrumented	Optic buried sensors
7	FWG's Instrumented	Optic buried sensors
8	FWG's Instrumented	Optic buried sensors
9	FWG's Instrumented	Optic buried sensors
10	FWG's Instrumented	Optic buried sensors
11	Manta 1	Inert - not instrumented
12	Manta 2	Inert - not instrumented
13	Rockan 1	Inert - not instrumented
14	Rockan 2	Inert - not instrumented
15	Bomb 1	Inert - not instrumented
16	Bomb 2	Inert - not instrumented

### 1.2.1 ACOUSTIC INSTRUMENTED MINES (AIMs)

The Acoustic Instrumented Mines were developed by the Naval Research Laboratory (NRL) and Omni Technologies, Inc. (Fig. 5). These Instrumented Mines, based on cylindrical mines, are constructed of Naval Aluminum Bronze and measure both the processes that initiate and affect burial and subsequent buried mine behavior. The AIMs use 112 acoustic burial sensors mounted flush with the mine surface, that measure burial and dimensional characteristics of the scour pit. Roll, pitch, and mine heading are measured with accelerometers and electronic compasses. Accelerometers (3-axis) are used to detect mine motion that occurs as a result of the mine falling into a scour pit or of the seafloor liquefying. Pressure sensors measure bottom pressure fluctuations associated with tidal changes and surface gravity waves. Coherent acoustic Doppler sensors have been added to two of the AIMs, to measure hydrodynamic flow rates around the mines. Flow rates (mean and instantaneous) calculated from the Doppler sensors and sediment concentration values calculated from acoustic backscatter of the burial sensors are used to estimate rates of sediment transport. Additional technical details on the AIMs are available in reference [1 and 2]. Data collections strategies (e.g., rate, duration, frequency) are adjustable for most parameters. The programmed configuration for this experiment is provided in Table 3. Post processing of the acoustically collected data (burial and dimensional characteristics of the scour pit) has not yet been completed. An estimate of the AIMs burial can be inferred by subtracting the NOAA recorded tide data from the pressure data recorded in each AIM - appendix 8 is the graphical representation

of these data. Appendix 9 provides the AIMs orientation (heading, pitch and roll) and environmental (significant wave height, water temperature, tides and wave period) data.

Burial, relative to the water-sediment interface, of all the AIMs changed very little (maximum burial about 10 cm) until about day date 18 when the significant wave heights increased substantially (2.5 to 3 m) and all mines exhibit pitch and roll motion and the mines changed heading. Mine burial increased to about 40 cm (which is nearly 75% of the AIMs diameter). Note that the experiments began on day date 8 or January 8<sup>th</sup> therefore day date 18 is approximately 10 days after the experiments began. A second storm with 2.5 to 3.0 m significant wave heights on day date 24-25 is correlated with additional mine movement and burial after day date 25 only AIMs 1 & 3 exhibited any motion and this was correlated with a storm on day date 55.

AIM 1 made only slight changes in the heading (less than 5 degrees during the entire deployment) that correspond with periodic increases in the significant wave height. Changes in heading were accompanied with rapid changes in pitch and a significant roll (up to 30 °). The data suggest significant wave heights greater than 2 m cause scour around the mine. After a significant amount of scour occurs the mine begins to pitch and rolls into the scour pit changing heading to align with the swell. AIM 2 made a total heading change of about 9 degrees during the entire deployment with the changes occurring within the first 15 days and corresponding to the significant wave height events exceeding 2 meters. Similar changes in pitch and roll accompanied heading changes but were restricted to storms on day dates 18 and 24-25. AIM 3's changes in heading closely mimicked those of AIM 1's but were roughly double the amplitude. The total roll for the deployed period was about 30 degrees (although in the opposite direction as AIM 1). AIM 4's heading closely mimicked AIM 2's heading changes (and amplitude) and correspond with the increases in significant wave height, however AIM4 rolled in the opposite direction compared to AIM3. After the initial two significant scour events, around the AIMs, additional scour was not sufficient to cause a notable increase in burial.

Burial recorded on the FWG mines (Appendix 10) exhibits similar trends to the AIMs with increasing in burial occurring during storm events. The percent burial however never exceeded 50% of the sensors covered. This data suggests that although mines buried to almost their full diameter (50 cm) the scour pits were never completely filled and the surface area of the mines remained exposed. This scenario for burial is supported by both diver and ROV video camera observations of the mines.



Figure 5. Four Acoustic Instrumented Mines (AIMs).

Table 3. Program configuration of AIMs for the IRB experiment. Note that pressure samples were collected for 5 minutes at each sample interval.

<b>AIM #</b>	<b>Pressure Sample interval (min)</b>	<b>Temperature Sample interval (min)</b>	<b>Orientation Sample interval (min)</b>	<b>Burial Sample interval (min)</b>	<b>Doppler Sample interval (min)</b>	<b>ADCP Sample interval (min)</b>
1	15	15	15	30	n/a	n/a
2	15	15	15	30	30	n/a
3	30	15	15	30	30	n/a
4	30	15	15	30	n/a	30

### 1.2.2 FWG INSTRUMENTED MINES

Ingo Stender of FWG in Kiel, Germany developed self-recording mines that use optical methods to record the mine burial state [3; Fig. 6]. Burial is measured by three rings of paired optical sensors externally mounted at even intervals around the mines. Transmitting optical sensors are LED's and receiving optical sensors are phototransistors. Burial is detected by blockage of these sensors. See Appendix 7 for additional



information concerning the FWG instrumented mines. For this experiment the sample rate (for each FWG mine) to detect sensor burial was set at 15 minutes. Thomas Wever and Rolf Lühder, both of FWG, prepared these Instrumented mines and oversaw their deployment and recovery. Appendix 10 displays data collected by the FWG mines during this experiment in the form of percent of sensors buried (for each mine).



Figure 6. Six FWG Instrumented Mines.

### 1.2.3 INERT MINE SHAPES

In addition to the two types of instrumented mines (AIMs and FWGs), three types of inert mines were deployed. These types included the Italian Manta bottom mine, with truncated cone and handling padeyes (Fig. 6). The Manta mine is a fairly sophisticated weapon that is laid on the ocean floor and is set off by a ship's magnetic, acoustic, or pressure signature. Two Swedish Rockan mines were also deployed (Fig. 8). Both the plastic-shelled Manta and the wedge-shaped Swedish Rockan GMI-100 are current examples of reduced-signature mines that are believed to be difficult to detect acoustically. Two inert MK-82 general purpose [GP] 500-pound bombs (normally used in a free-fall, nonguided configuration) were also included as part of this experiment (Figure 9).

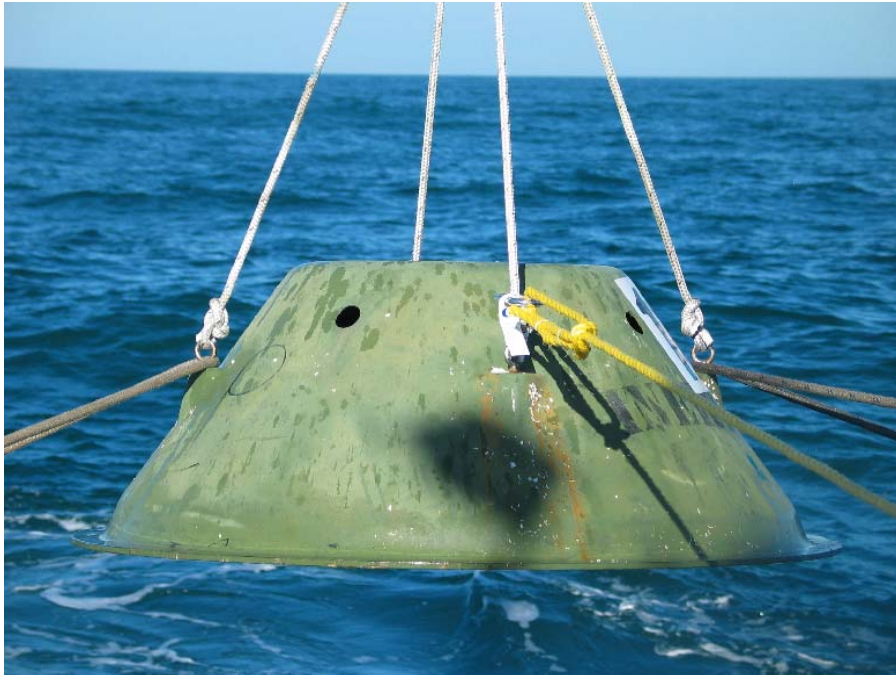


Figure 7. Inert Manta mine shape.



Figure 8. Inert Rockan mine shape.





Figure 9. Inert General Purpose MK82 500-lb bomb.

### 1.3 SEDIMENTS

Sediments were sampled by divers using 6.1-cm-diameter cores that were pushed into the top 12-23 cm of sand. In January during the mine deployment phase cores were collected north and south, but proximal to, mines # 1, 2, 3, 4, 5, 6, 9, and 10. A single core was collected proximal to mines # 7, 8, 11, 12, 13, 14, 15, and 16. In March during the recovery phase cores were collected in the scour pits of mines # 1, 2, 3, 4, 7, 8, and 13. A core was collected from the pit in which the mine had been sitting for each mine except mines # 7, 8, and 13. In addition, two cores from each of the three sites were collected.

Upon collection, recovery, and sealing (with electrical tape) of cores, they were acoustically logged at 400 kHz within 24-72 hours. During the mine recovery phase, some cores were logged at 200 kHz. The equipment and technique used to log the cores is described in Richardson et al.[4]. After the cores were transported to shore, and subsequent to acoustic logging, the cores were assayed for water content, either in 2-cm sections or in their entirety. Samples were dried in a drying oven for 24 hours at 105°C, cooled in desiccators, weighed, and preserved in sealed plastic bags for further analyses of average grain density and grain size distribution [5].

There are two sediment types in the deployment area: fine sand and coarse sand. The fine sand at site 3 is essentially the same as that at site 1. The vertical distribution of sediment sound speed at 400 kHz at all three sites is displayed in Fig. 10. These measurements were made on cores collected during the mine deployment in January. Measurements of sound speed at 200 and 400 kHz made on six cores collected during the mine recovery are displayed in Fig. 11.

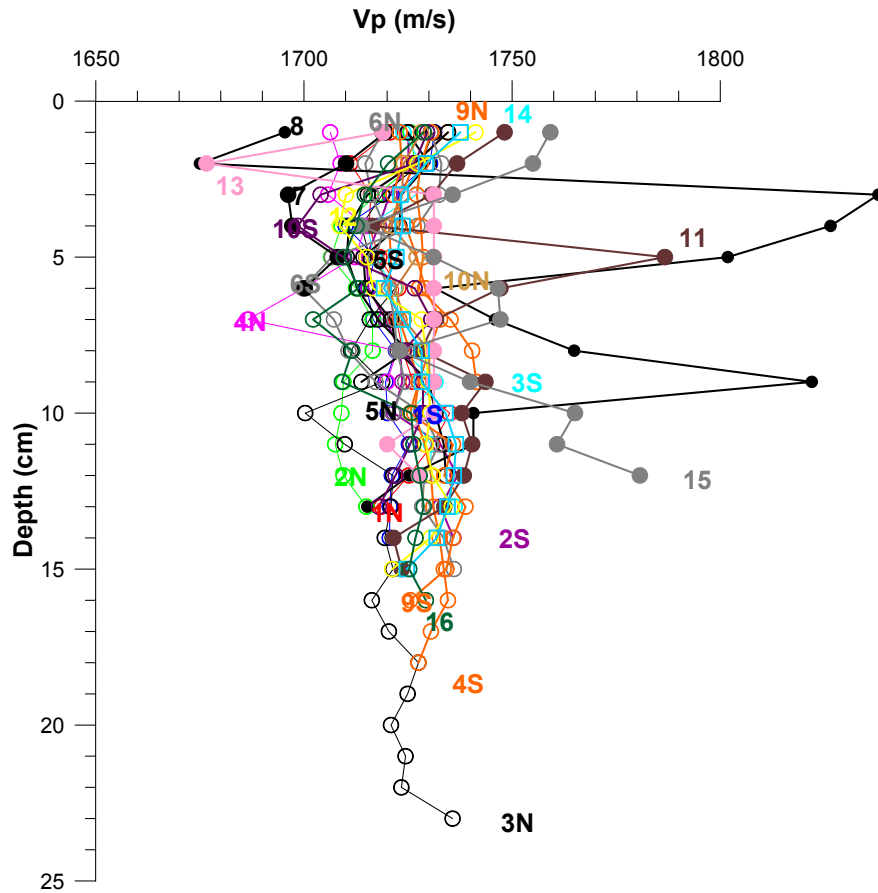


Figure 10. Vertical distribution of sediment sound speed at 400 kHz for 23 cores measured during the mine deployment in January 2003.

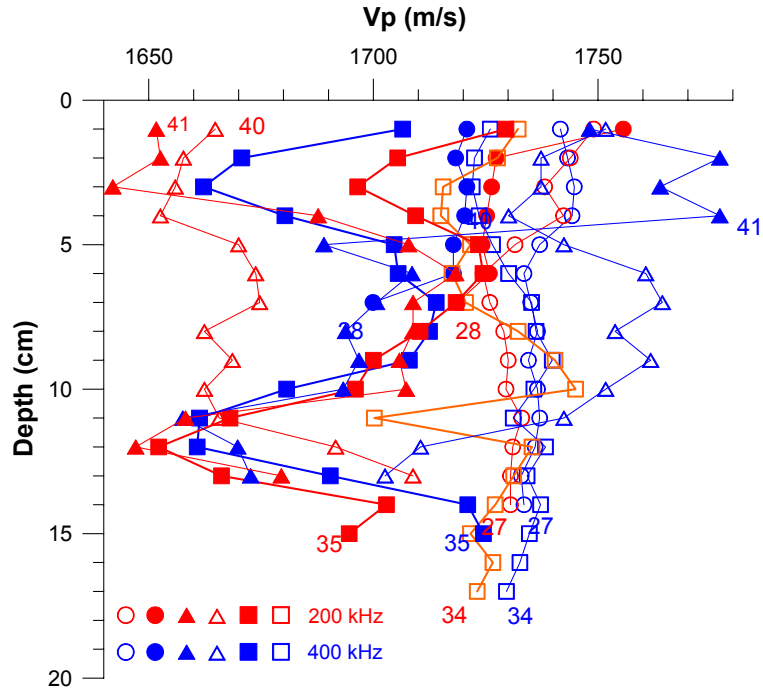


Figure 11. Vertical distribution of 200 and 400 kHz sediment sound speed measured on six cores during mine recovery in March 2003.

Vertical distribution of sediment porosity measured on 15 of the 23 cores collected at the mine deployment is displayed in Fig. 12. Note that core 4N is slightly anomalous when compared with the other samples collected from fine sand (lower porosity). Sediment porosity for the six cores sectioned from the 25 cores collected during the mine recovery is shown in Fig. 13.

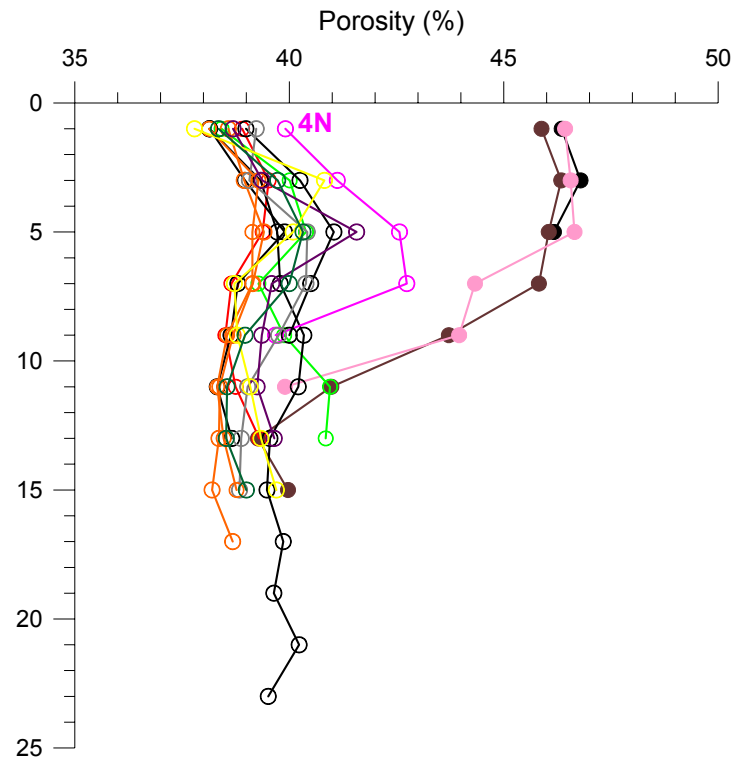


Figure 12. Vertical distribution of sediment porosity measured on cores collected during deployment.

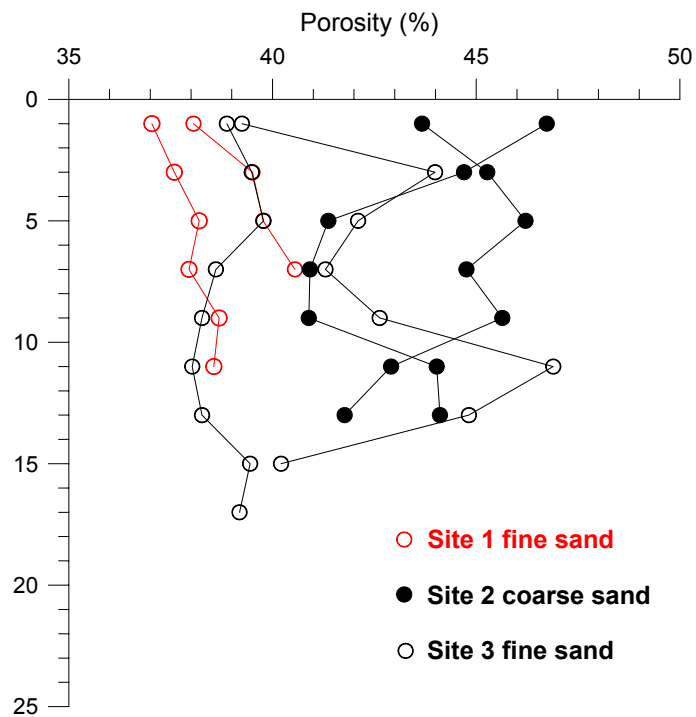


Figure 13. Vertical distribution of sediment porosity measured on cores collected during recovery

Porosity and density data for the remaining cores, which were assayed as whole cores (unsectioned) are displayed in Table 4. Three cores collected during the mine deployment were analyzed for grain size distribution and the variation in mean grain size as a function of depth in the sediment is presented in Fig. 14. Fine sediment was well sorted quartz sand; coarse sediment was predominantly carbonate shell hash resulting from abrasion and weathering of mollusk shells. These data indicate that the coarse sand overlies the fine sand and that the coarse sand is about 12 cm thick. Grain size distributions for sectioned cores from the three sites are shown in Appendix 5.

Table 4. List of cores collected during deployment and recovery (shaded rows) that were analyzed for water content as whole cores and the values of sediment porosity and bulk density. Cores collected north (N) and south (S) of mines are indicated.

Nearest Mine	Core	Depth (cm)	Porosity (%)	Bulk Density (g/cm <sup>3</sup> )
1	TB1S	0-14	39.17	2.03
3	TB3S	0-14	38.84	2.04
5	TB5S	0-12	39.53	2.02
6	TB6N	0-10	39.75	2.02
9	TB9N	0-10	38.61	2.04
10	TB10N	0-10	37.22	2.06
14	TB14	0-16	38.96	2.03
15	TB15	0-12	45.09	1.97
1	TB17 (1)*	0-19	40.33	2.009
1	TB18 (1)†	0-11	42.02	1.999
2	TB19 (2)*	0-11	63.75	1.624
2	TB20 (2)†	0-18	39.38	2.019
3	TB21 (3)*	0-11	47.47	1.89
3	TB22 (3)†	0-12	40.18	2.015
4	TB23 (4)*	0-6	48.33	1.874
4	TB24 (4)†	0-22	41.56	1.984
5	TB25 (5)†	0-8	44.28	1.941
6	TB26 (6)†	0-9	38.39	2.041
12	TB29 (12)†	0-8	32.97	2.129
14	TB30 (14)†	0-8	37.85	2.053
16	TB31 (16)†	0-8	40.9	2.001
9	TB32 (9)†	0-16	40.39	2.012
10	TB33 (10)†	0-7	45.63	1.92
7	TB36 (7)*	0-10	45.72	1.956
8	TB37 (8)*	0-8	36.4	2.091
11	TB38 (11)†	0-10	39.72	2.034
13	TB39 (13)*	0-11	40.71	2.023

( ) mine #      \* scour pit      † pit

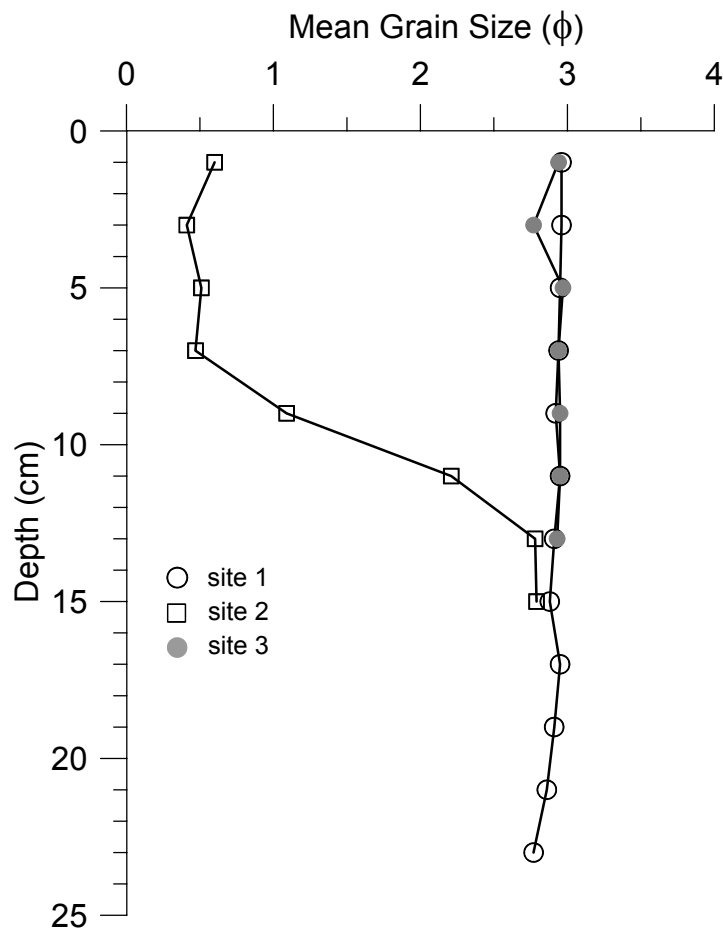


Figure 14. Variation in mean grain size, in phi units, as a function of depth in the sediment.

#### 1.4 DIVER OBSERVATIONS AT RECOVERY

Appendix 1 provides a column with the orientation of each mine and mine shape upon recovery as well as deployment. Appendix 3 is the comments and notes provided by the divers during the recovery operations. Photographs taken by the divers at the time of recovery are provided in Appendix 4. Samples of worm tubes found around mines were collected and preserved in 5% formalin.

#### 1.5 ACKNOWLEDGMENTS

The captain and crew of the R/V SUNCOASTER exhibited excellent seamanship for both the deployment and recovery of all the equipment. The divers Ricky Ray, Robert Fisher, Robert Brown, Chad Vaughan, Kevin Briggs and Michael Richardson positioned the equipment on the seafloor, made detailed observations and recovered many samples. Conrad Kennedy, Grant Bower and John Bradley prepared the instrumentation for deployment and provided logistical support during the experiments. Thomas Wever and

Rolf Lühder of FWG in Kiel, Germany provided six of their optically instrumented mines and participated in the deployment of these mines. David Naar and Brian Donahue of the University of South Florida (USF) were instrumental in the logistics support, precision navigation of the ship, and invaluable support aboard the ship during the deployment and recovery.

This experiment was supported by Office of Naval Research through Naval Research Laboratory core funding under PE602782N.

## 1.6 REFERENCES

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- [2] S. Griffin, J. Bradley, and M.D. Richardson, “Improved subsequent burial instrumented mines,” *Sea Technology*, vol. 44 (11), pp. 40-44, 2003.
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- [4] M.D. Richardson, K.B. Briggs, S.J. Bentley, D.J. Walter and T.H. Orsi, “The effects of biological and hydrodynamic processes on physical and acoustic properties of sediments off the Eel River, California,” *Marine Geology*, vol. 182 (1-2), pp. 121-140, 2002.
- [5] Briggs, K.B., High-frequency acoustic scattering from sediment interface roughness and volume inhomogeneities,” NRL/FR/7431—94-9617, Naval Research Laboratory, Stennis Space Center, 154p., 1994.

*Appendix 1.*

**Deployed location of Each Mine Shape (actual Shape location on bottom):**

			Deployed Orientation	Recovered Orientation
AIM#1	27° 57.819' N	83° 02.749' W	N-S	
AIM#2	27° 57.850' N	83° 02.735' W	E-W	
AIM#3	27° 57.854' N	83° 02.755' W	N-S	
AIM#4	27° 57.832' N	83° 02.747' W	E-W	
FWG #5	27° 57.817' N	83° 02.715' W	N-S	N-S
FWG #6	27° 57.847' N	83° 02.711' W	E-W	345°-165°
FWG #7	27° 58.103' N	83° 02.948' W	E-W	N-S
FWG #8	27° 58.075' N	83° 02.946' W	N-S	240°- 60°
FWG #9	27° 58.199' N	83° 03.278' W	E-W	E-W
FWG #10	27° 58.198' N	83° 03.297' W	N-S	200°- 20°
Manta #11	27° 58.088' N	83° 02.936' W	N/A	N/A
Manta #12	27° 57.818' N	83° 02.732' W	N/A	N/A
Rockan #13	27° 57.088' N	83° 02.951' W	Hdg 330°	Hdg 120°
Rockan #14	27° 57.832' N	83° 02.747' W	Hdg 315°	not given
Bomb #15	27° 58.102' N	83° 02.936' W	Hdg 200°	N-S (pointed S)
Bomb #16	27° 57.832' N	83° 02.716' W	Hdg 110°	E-W(pointed E)

All at a water depth of approximately 13 meters.



## *Appendix 2.*

### **PHYSICAL CHARACTERISTICS OF MINE AND MINE SHAPES:**

#### **NRL's Acoustic Instrumented Mines (AIM)**

Length:	80 inches	(2.032 m)
Diameter:	21 inches	(0.533 m)
Wt (air):	1764 lbs	(800 kg)
Wt (water):	735 lbs	(333 kg)
Density:	0.0636 lbs/in <sup>3</sup>	(1762 kg/m <sup>3</sup> )

#### **FWG's Burial Registration Mines**

Length:	59 inches	(1.499 m)
Diameter:	18.5 inches	(0.470 m)
Wt (air):	1213 lbs	(550 kg)
Wt (water):	624 lbs	(283 kg)
Density:	0.0765 lbs/in <sup>3</sup>	(2117 kg/m <sup>3</sup> )

#### **Manta**

Diameter:	40 inches with an additional 1.75-inch lip at the bottom— (truncated-cone shape tapers to about 19 inches at top)	
Height:	17 inches	
Wt (air):	575 lbs	(260 kg)
Wt (water):	225 lbs	(102 kg)
Density:	0.059 lbs/in <sup>3</sup>	(1637 kg/m <sup>3</sup> )

#### **Rockan**

Length:	40 inches	
Width:	32 inches max—tapers to front	
Height:	15 inches at max—tapers to the rear	
Wt (air):	#14: 470 lbs (213 kg)	#13: 410 lbs (186 kg)
Wt (water):	#14: 240 lbs (109 kg)	#13: 160 lbs (73 kg)
Density:	#14: 0.0736 lbs/in <sup>3</sup> (2036 kg/m <sup>3</sup> )	#13: 0.059 lbs/in <sup>3</sup> (1634 kg/m <sup>3</sup> )

#### **Bombs (MK82)**

Length:	61 inches
Diameter:	10.5 inches max—tapers to nose
Wt (air):	490 lbs (222 kg)
Wt (water):	325 lbs (147 kg)
Density:	0.1069 lbs/in <sup>3</sup> (2959 kg/m <sup>3</sup> )

*Appendix 3.*

**Summary of Divers Observations at Recovery:**

- AIM #1: ~75% of mine below sediment/water interface.  
Scour pit extended fully around the cylinder.  
Scour pit to front (numbered end) extended about 130 cm.  
Front end of mine was fully exposed with a scour pit extending ~50 cm below top of cylinder.  
Scour pit to rear extended about 100 cm.  
Rear end of mine was fully exposed with a scour pit extending ~50 cm below top of cylinder.  
Scour pit to right side (from rear facing toward numbered front end) extended 260 cm.  
Scour pit to left side extended 150 cm.  
The scour pit from the left side slope was very shallow and approached the angle of repose—whereas the right side scour pit slope was very gradual with a slight ripple at about the height level with the top of the mine cylinder.  
Shells were noticeable around this area—they could have been washed in or they could have been exposed by the scouring process. Sponges were noted—they appeared to have been unattached and had accumulated sediment.
- AIM #2: ~43% of mine exposed (not covered with sediment).  
~75% of mine below sediment/water interface.  
Scour pit extended only around each end.  
Scour pit to front (numbered end) extended ~110 cm.  
Front end of mine was fully exposed ~47 cm.  
Scour pit to rear extended about 80 cm.  
Rear end of mine was nearly all exposed ~43 cm.  
On each side sand was piled reaching the top at about the middle of the cylinder.  
Lots of empty worm (?) tubes and sand dollars in the general area around the mine.
- AIM #3: ~ 100% of mine below sediment/water interface.  
Scour pit extended fully around the cylinder.  
Scour pit to front (numbered end) extended ~110 cm.  
Front end of mine was fully exposed with a scour pit extending ~52 cm below top of cylinder.  
Scour pit to rear extended ~80 cm.  
Scour pit to right side (from rear facing toward numbered front end) extended 120 cm.

Scour pit to left side extended 200 cm.  
Big sand dollars everywhere (estimate at least one per square meter) and some starfish.  
Upon removal of the mine it was noted that in the pit the sediment consisted of a thin veneer of sand (a few mm thick) over ~6 cm of gray mud with some shells that covered a sediment mixture of fine sand and shells.

AIM #4: ~25% of mine exposed (not covered with sediment).  
~100% of mine was below sediment/water interface.  
Scour pit extended only around each end.  
Scour pit to front (numbered end) extended ~150 cm.  
Front end of mine was fully exposed with a scour pit extending ~45 cm below top of cylinder.  
Scour pit to rear extended ~90 cm.  
Rear end of mine was fully exposed with a scour pit extending ~90 cm below top of cylinder.  
On the sides and ends the sediment was a mixture of sand, mud and lots of big shells.

One of the divers observed dark sediment (probably sand) streaming out of the pits that the AIMs had sat in after they were removed. The sides of the pits (where the mines had been resting) slumped in, exposing hundreds of worm tubes. A very thin layer of shells was noticed just under the slumped sediment.

FWG #5: Was oriented about north/south.  
Front = south and rear = north.  
~80% of mine was below sediment/water interface.  
~70% of mine exposed (not covered with sediment).  
Scour pit extended fully around the mine.  
Scour pit to front extended ~90 cm.  
Scour pit to rear extended ~100 cm.  
Scour pit to right side extended 130 cm.  
Scour pit to left side extended 260 cm.  
Some infill was noted on each side.

FWG #6: Was oriented at about 345°.  
No differential was provided for front/rear.  
~90% of mine was below sediment/water interface.  
~80% of mine exposed (not covered with sediment).  
Scour pit extended fully around the mine.  
Scour pit to front extended ~90 cm.  
Scour pit to rear extended ~110 cm.  
Scour pit to right side extended 120 cm.  
Scour pit to left side extended 110 cm.

- FWG #7: Was oriented about north/south.  
 ~30% to 40% of mine was below sediment/water interface.  
 ~70% of mine exposed (not covered with sediment).  
 No scour pit.
- FWG #8: Was oriented about 240°-60°.  
 ~20% to 30% of mine was below sediment/water interface.  
 ~70% of mine exposed (not covered with sediment).  
 240° end was flush with sediment/water interface.  
 60° end exposed with a little scour under this end.  
 19 sensors were exposed on the center ring.  
 No scour pit.  
 A well developed ripple field was noted in this area—wavelength of ~100 to 120 cm with an amplitude of 15 to 20 cm.
- FWG #9: Was oriented about east/west.  
 Front = east and rear = west.  
 ~50% of mine was below sediment/water interface.  
 ~80% of mine exposed (not covered with sediment).  
 Scour pit extended fully around the mine.  
 Scour pit to front extended ~150 cm.  
 Scour pit to rear extended ~120 cm.  
 Scour pit to right side extended 110 cm.  
 Scour pit to left side extended 120 cm.  
 Only a few shells were noted in this area.
- FWG #10: Was oriented about 15° to 20°.  
 Front = north (~20°) and rear = south (~200°).  
 ~90% of mine was below sediment/water interface.  
 ~80% of mine exposed (not covered with sediment).  
 Scour pit extended fully around the mine.  
 Scour pit to front extended ~90 cm.  
 Scour pit to rear extended ~110 cm.  
 Scour pit to right side extended 120 cm.  
 Scour pit to left side extended 130 cm.  
 Only a few shells were noted in this area.
- Manta #11: ~0% of mine was below sediment/water interface.  
 ~100% of mine exposed (not covered with sediment).  
 No scour pit.  
 Coarse trough ripples were noted on the north side of this mine.
- Manta #12: ~85% of mine was below sediment/water interface.

~90% of mine exposed (not covered with sediment).  
Scour pit extended fully around the circumference of the mine.  
Scour pit to northwest extended ~70 cm.  
Scour pit to northwest was slightly deeper.  
Scour pit to southeast extended ~100 cm.

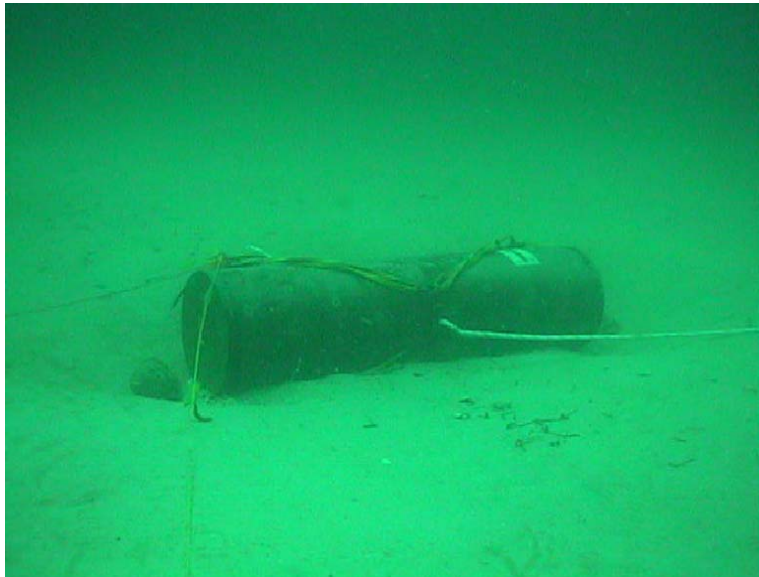
Rockan #13: Was oriented with the narrower/taller end at ~120°.  
~0% of mine was below sediment/water interface.  
~100% of mine exposed (not covered with sediment).  
No scour pit—sitting very proud

Rockan #14: ~50% of mine was below sediment/water interface.  
~90% of mine exposed (not covered with sediment).  
Scour pit extended fully around the circumference of the mine.  
Scour pit to front (narrower/taller) extended ~100 cm.  
Scour pit to rear extended ~120cm.  
Scour pit to left side extended ~100cm.  
Scour pit to right side extended 70 cm.

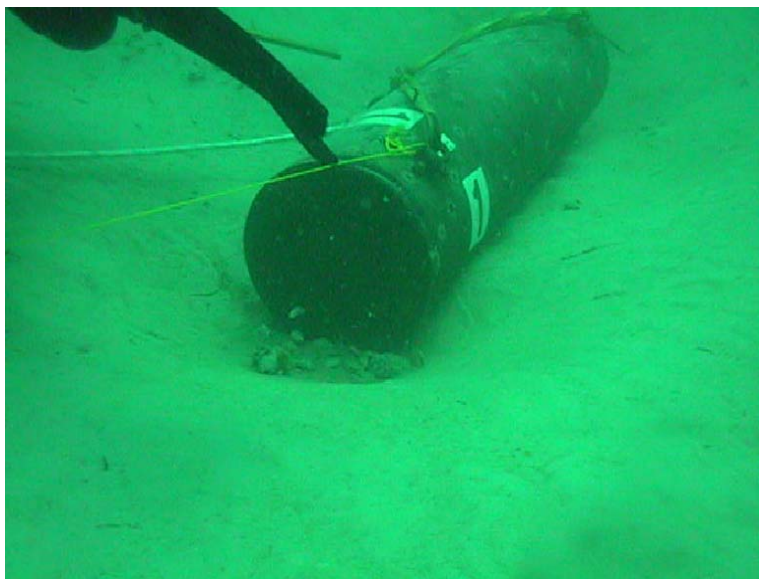
Bomb #15: Was in a north/south orientation (pointed end: south).  
~90% of bomb exposed.  
No scour pit noted.

Bomb #16: Was in an east/west orientation (pointed end: east).  
~50% of bomb exposed.  
Scour pit extended fully around the bomb.  
Scour pit to front extended ~70 cm.  
Front end of bomb was fully exposed—washed out somewhat under the  
Nose—in general only about 25% of the front was buried.  
Scour pit to rear extended ~40 cm.  
Rear end of mine was exposed ~15 cm.  
Scour pit to right side (from rear facing toward pointed/front end)  
extended 110 cm.  
Scour pit to left side extended 50 cm.  
Only a few shells were observed in this area.

*Appendix 4.*



AIM # 1 at recovery



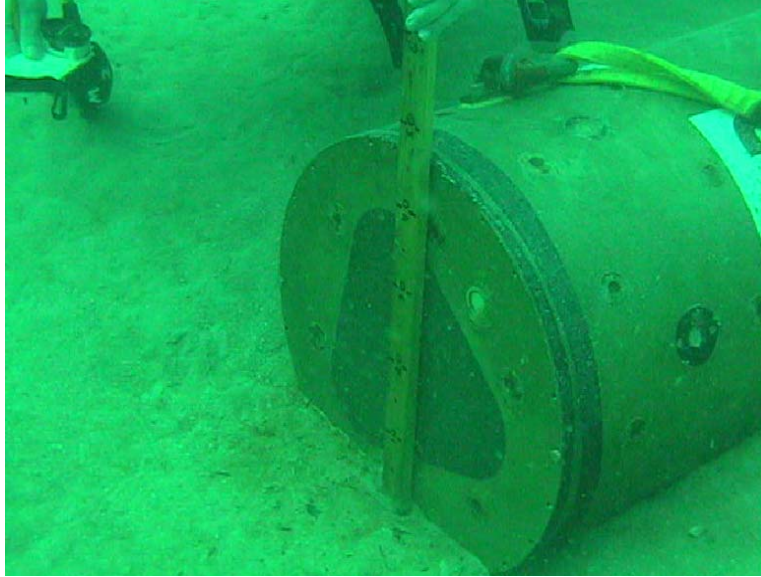
End view of AIM # 1 at recovery



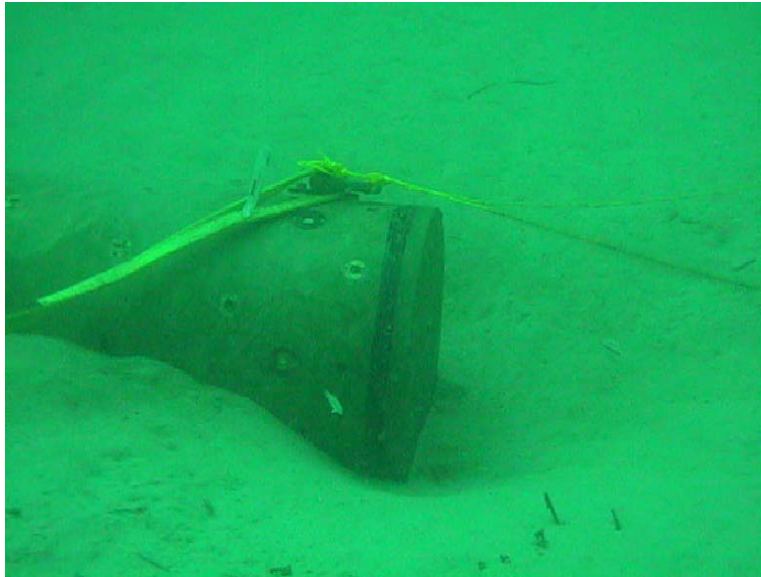
Close-up of pit left by AIM # 1



AIM # 2 at recovery

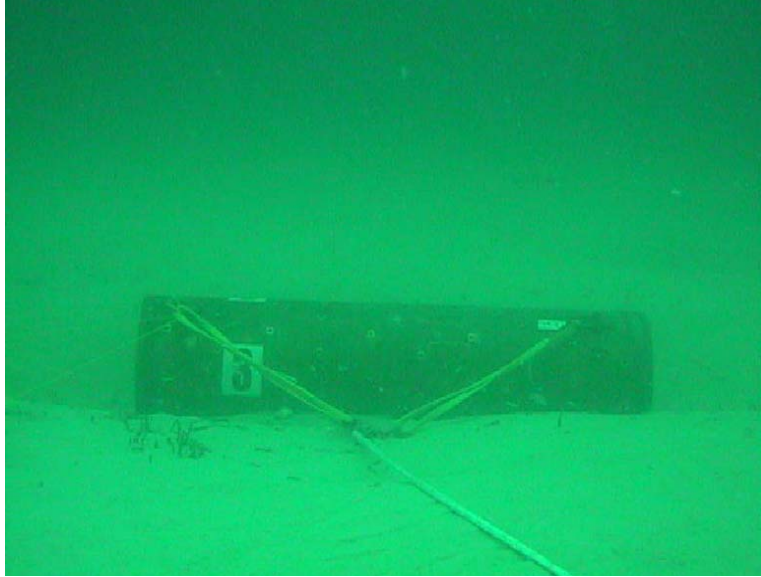


End view of AIM # 2 at recovery



Rear view of AIM # 2 at recovery—note worm tubes and scour pit





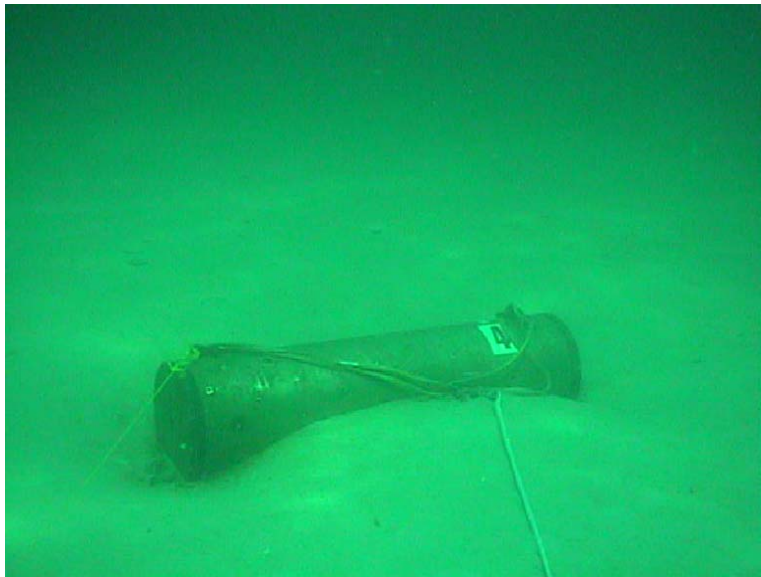
AIM # 3 at recovery



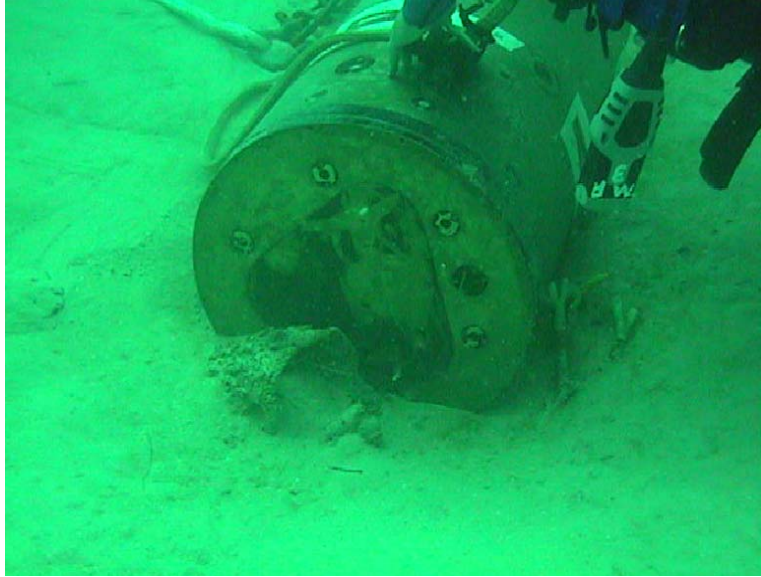
End view of AIM # 3 at recovery



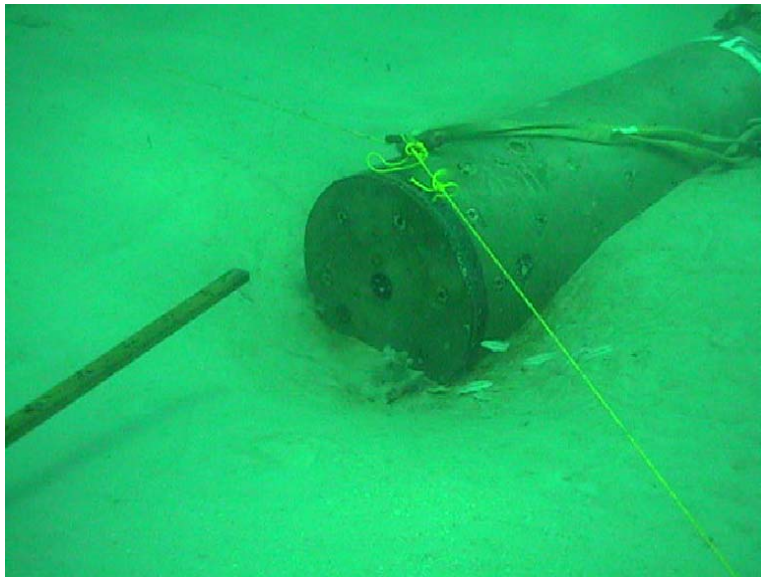
Rear view of AIM # 3 at recovery— note worm tubes and scour pit



AIM # 4 at recovery



End view of AIM # 4 at recovery



Rear view of AIM # 4 at recovery



Close-up of pit left by AIM # 4



FWG # 5 at recovery





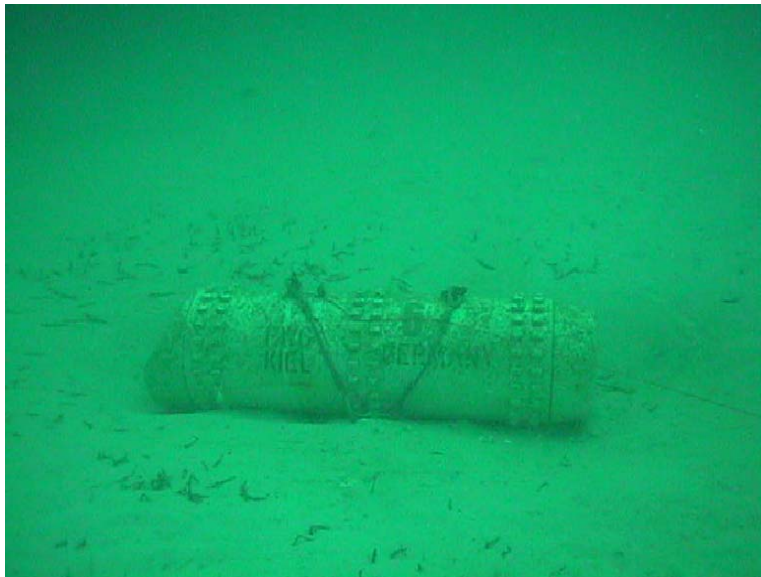
End view of FWG # 5 at recovery



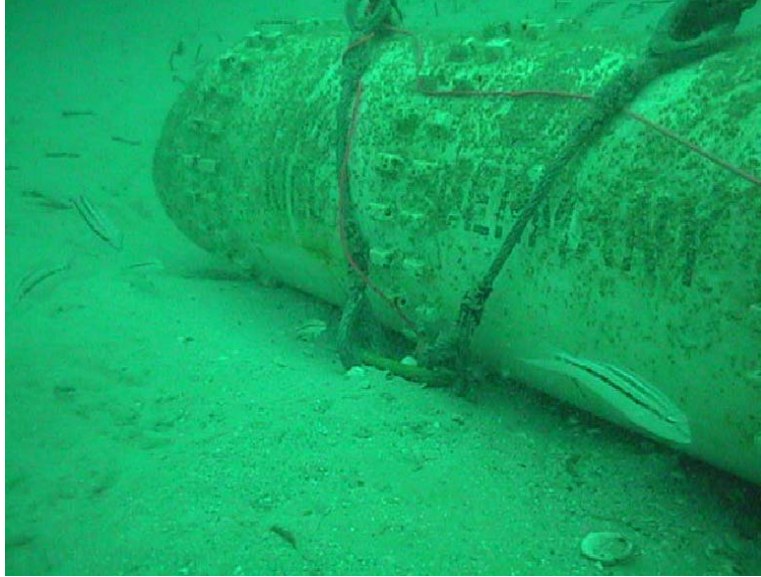
Rear view of FWG # 5 at recovery



Close-up of pit left by FWG # 5



FWG # 6 at recovery



End view of FWG # 6 at recovery

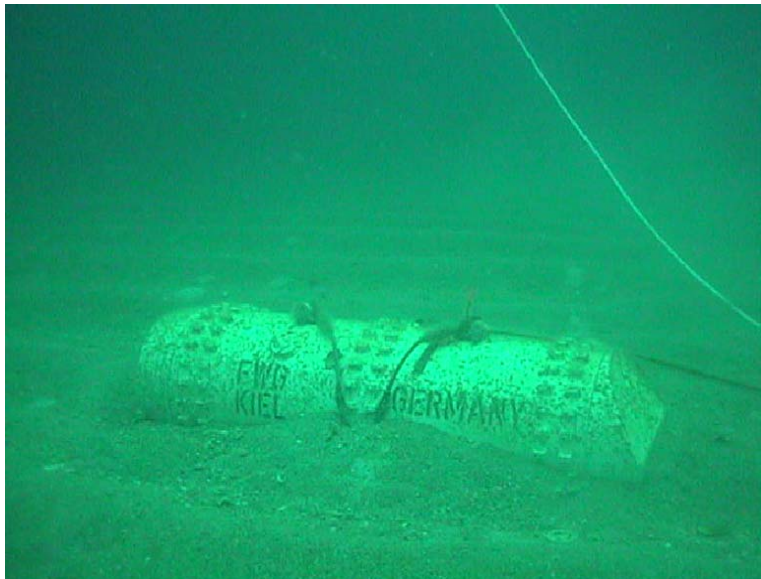


Rear view of FWG # 6 at recovery





Close-up of pit left by FWG # 6

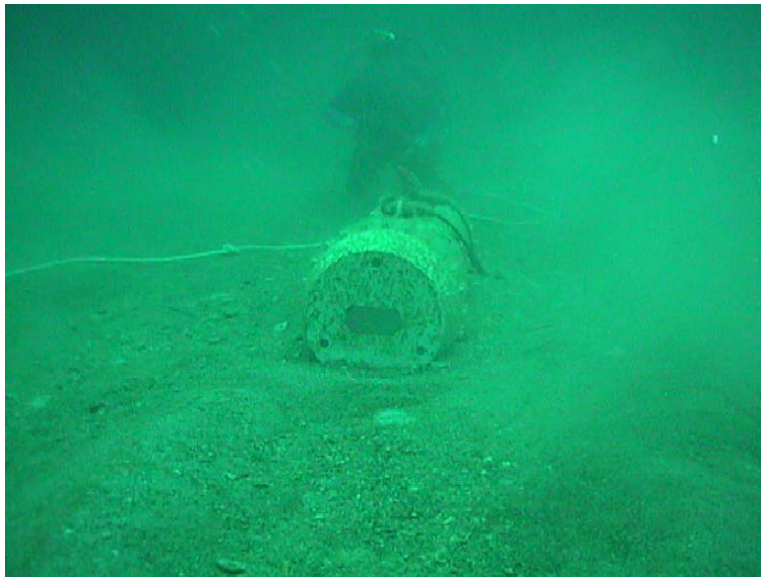


FWG # 7 at recovery





End view of FWG # 7 at recovery



Rear view of FWG # 7 at recovery



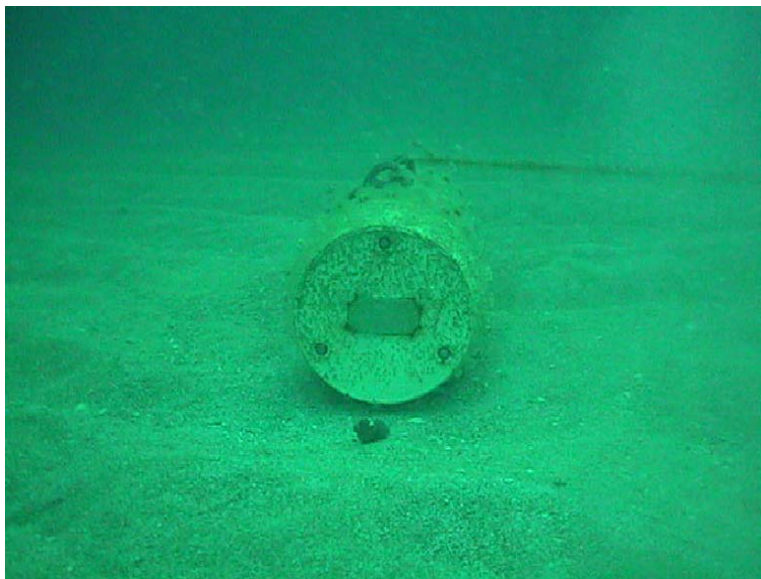
Pit left by FWG # 7



FWG # 8 at recovery

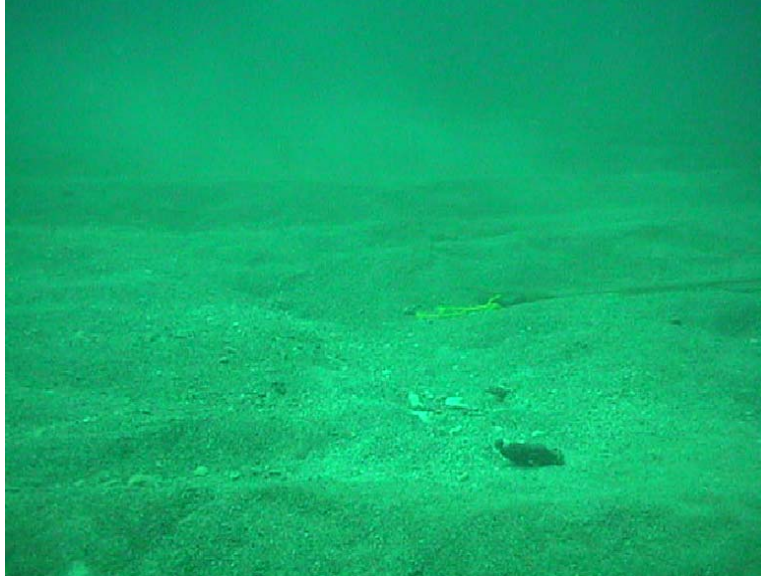


End view of FWG # 8 at recovery



Rear view of FWG # 8 at recovery

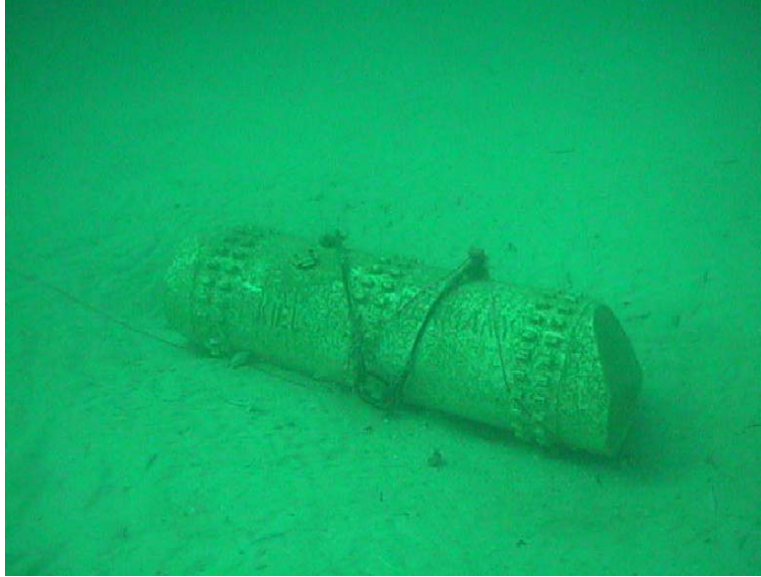




Pit left by FWG # 8



Collecting diver core near pit left by FWG # 8



FWG # 9 at recovery



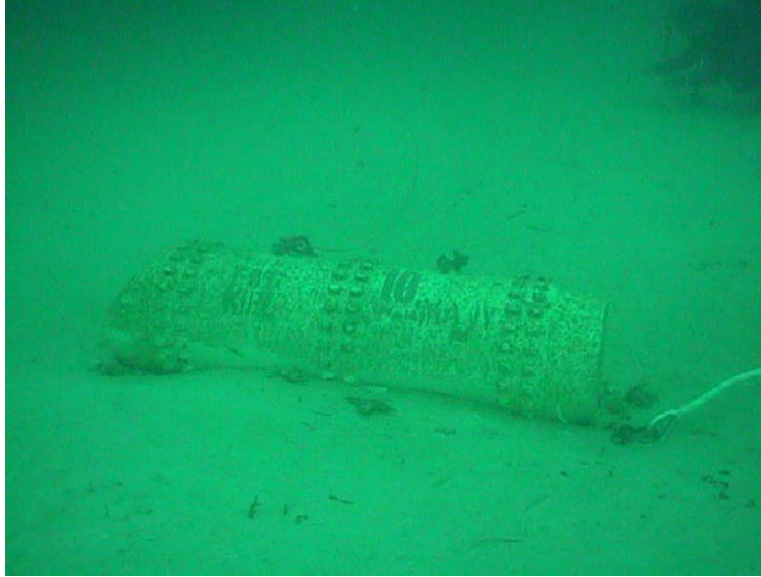
End view of FWG # 9 at recovery



Rear view of FWG #9 at recovery



Pit left by FWG #9

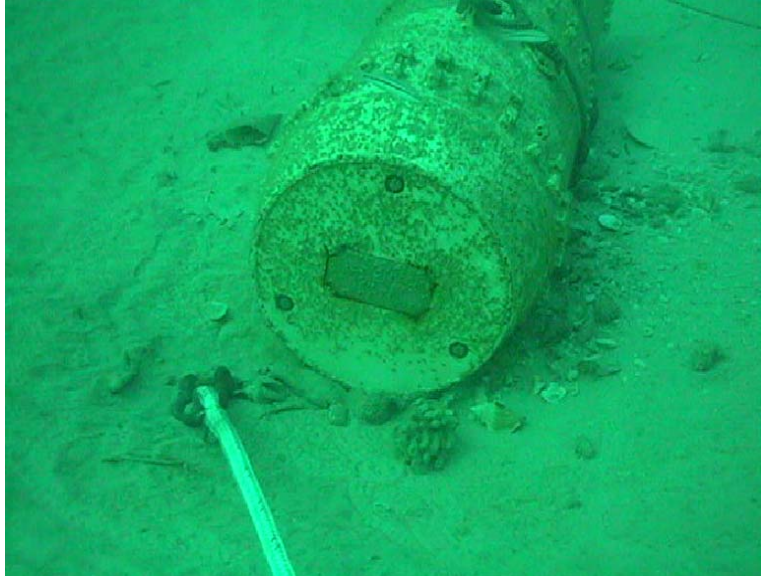


FWG # 10 at recovery



End view of FWG # 10 at recovery



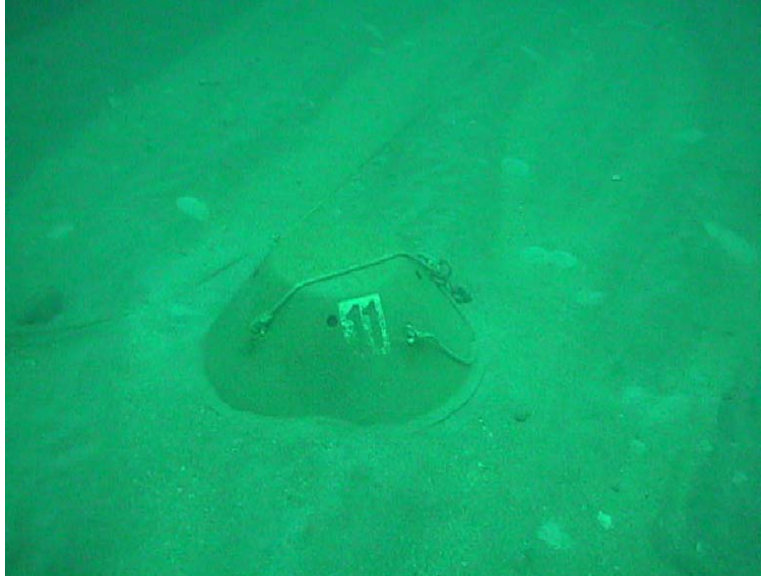


Rear view of FWG # 10 at recovery



Pit left by FWG # 10

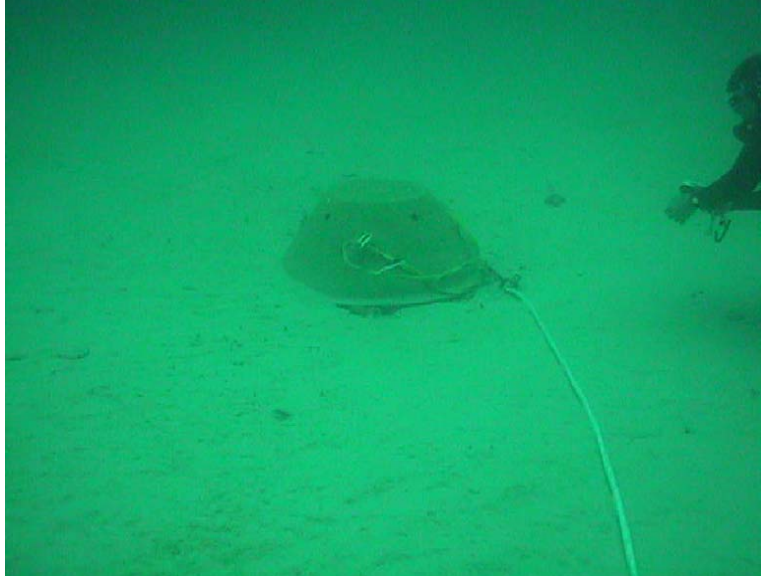




Manta # 11 at recovery



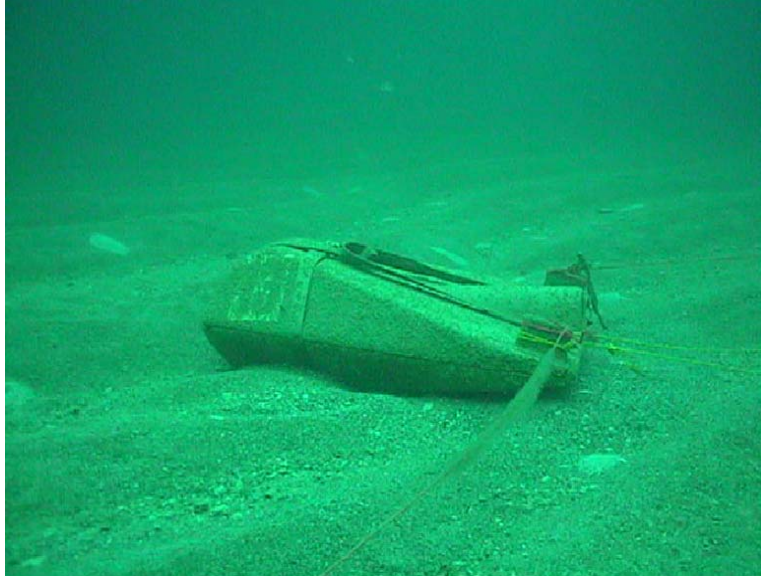
Pit left by Manta # 11



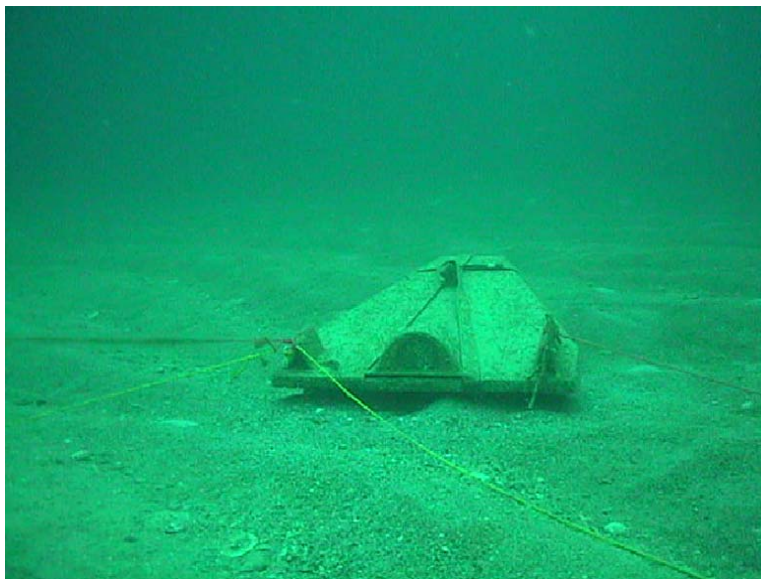
Manta # 12 at recovery



Pit left by Manta # 12



Rockan # 13 at recovery



Rear view of Rockan # 13 at recovery





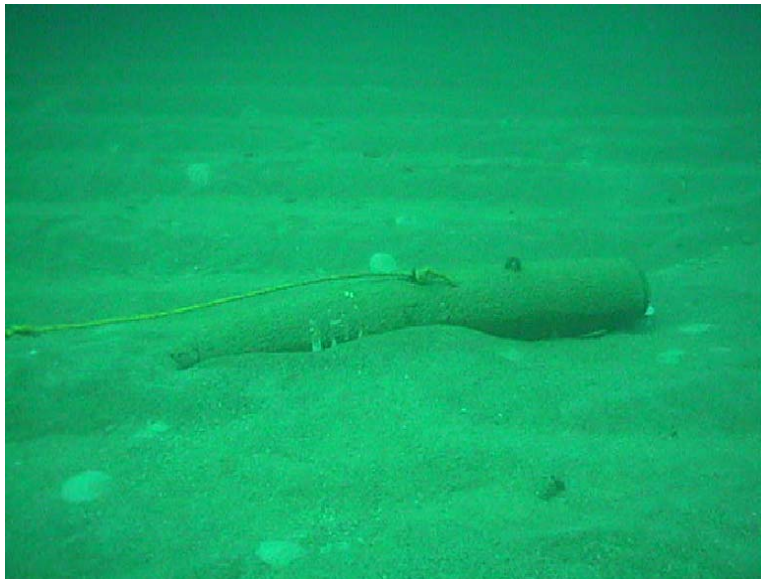
Pit left by Rockan # 13



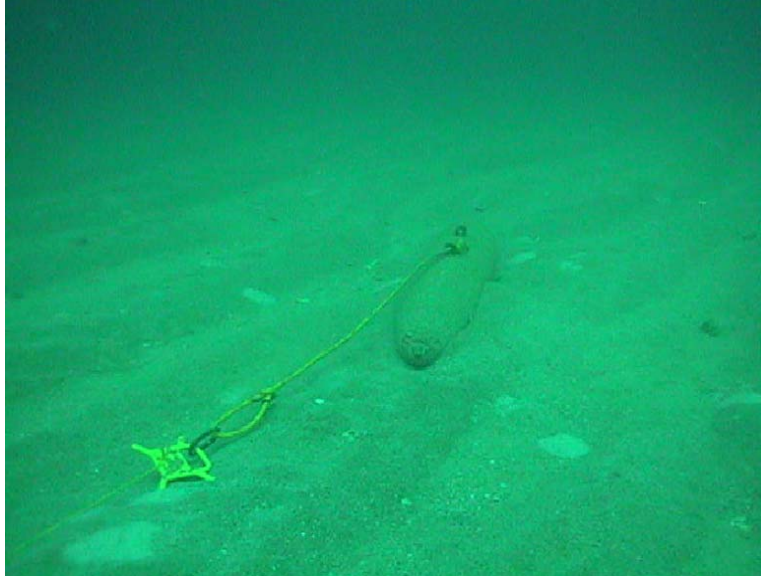
Rockan # 14 at recovery



Rear view of Rockan # 14 at recovery



Bomb # 15 at recovery



Front view of Bomb # 15 at recovery



Rear view of Bomb # 15 at recovery

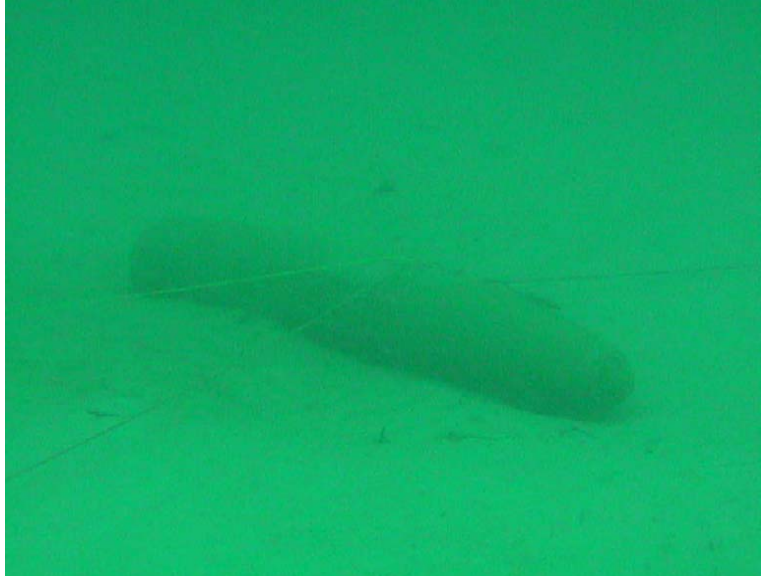




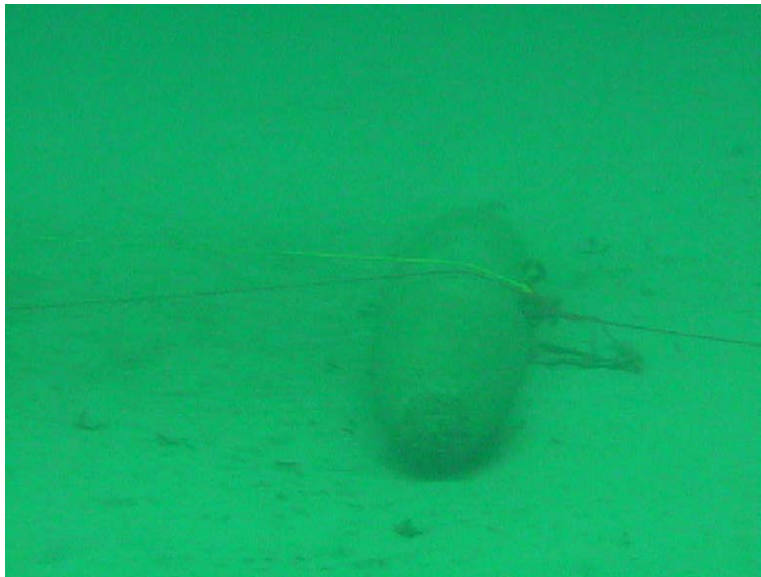
Close-up of pit left by Bomb # 15



Ripples near location of Bomb # 15

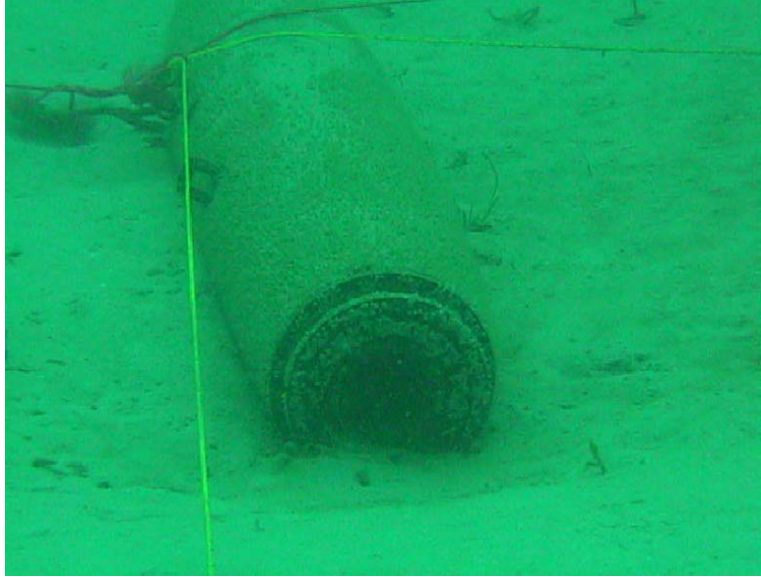


Bomb # 16 at recovery

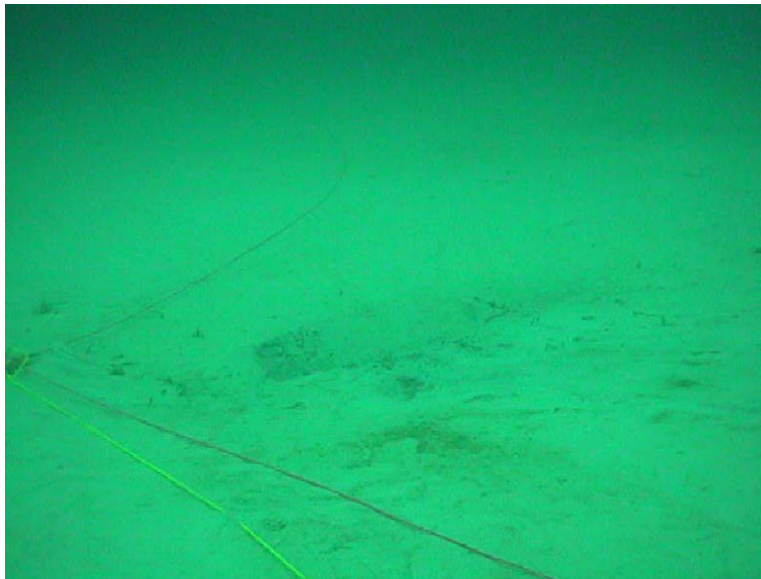


Front view of Bomb # 16 at recovery





Rear view of Bomb # 16 at recovery



Pit left by Bomb # 16

*Appendix 5: Grain size distributions for cores 3N, 10S, and 11.*

Cruise: Tampa Bay  
Date: 9 Jan 03

Station: 3 N  
Latitude: 27-57.854'N

Sample: 0-2 cm  
Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.012	0.01	0.01
-1.00	0.020	0.02	0.03
-0.75	0.038	0.04	0.08
-0.50	0.038	0.04	0.12
-0.25	0.046	0.05	0.17
0.00	0.049	0.05	0.22
0.25	0.131	0.14	0.36
0.50	0.144	0.16	0.51
0.75	0.184	0.20	0.71
1.00	0.212	0.23	0.94
1.25	0.191	0.21	1.15
1.50	0.361	0.39	1.54
1.75	0.428	0.46	2.00
2.00	0.666	0.72	2.71
2.25	1.260	1.36	4.07
2.50	3.071	3.31	7.38
2.75	11.767	12.67	20.04
3.00	33.726	36.31	56.35
3.25	26.189	28.19	84.55
3.50	9.099	9.80	94.34
3.75	1.796	1.93	96.28
4.00	0.951	1.02	97.30
4.50	0.305	0.33	97.63
5.00	0.112	0.12	97.75
5.50	0.112	0.12	97.87
6.00	0.112	0.12	97.99
6.50	0.112	0.12	98.11
7.00	0.112	0.12	98.24
7.50	0.112	0.12	98.36
8.00	0.112	0.12	98.48
9.00	0.236	0.25	98.73
10.00	0.236	0.25	98.98
11.00	0.236	0.25	99.24
12.00	0.236	0.25	99.49
13.00	0.236	0.25	99.75
14.00	0.236	0.25	100.00

Post-analytical weight: 92.89

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.32	2.67	2.78	2.96	3.17	3.25	3.58
Percentages of:						
Gravel		Sand		Silt		Clay
0.03		97.27		1.18		1.52
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.96	0.34	-0.00	1.36	0.58	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.96	2.96	0.29	0.00	-0.01	1.20	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.70	1.19	2.96	44.16		

Cruise: Tampa Bay      Station: 3N      Sample: 2-4 cm  
Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.000	0.00	0.00
-1.00	0.022	0.02	0.02
-0.75	0.014	0.02	0.04
-0.50	0.031	0.03	0.07
-0.25	0.042	0.05	0.12
0.00	0.038	0.04	0.16
0.25	0.055	0.06	0.22
0.50	0.081	0.09	0.31
0.75	0.086	0.09	0.40
1.00	0.093	0.10	0.50
1.25	0.087	0.09	0.60
1.50	0.184	0.20	0.80
1.75	0.243	0.26	1.06
2.00	0.499	0.54	1.61
2.25	1.056	1.15	2.76
2.50	2.906	3.16	5.92
2.75	11.644	12.68	18.60
3.00	35.520	38.68	57.29
3.25	25.359	27.62	84.90
3.50	8.880	9.67	94.58
3.75	1.167	1.27	95.85
4.00	0.875	0.95	96.80
4.50	0.325	0.35	97.15
5.00	0.150	0.16	97.32
5.50	0.150	0.16	97.48
6.00	0.150	0.16	97.64
6.50	0.150	0.16	97.81
7.00	0.150	0.16	97.97
7.50	0.150	0.16	98.13
8.00	0.150	0.16	98.30
9.00	0.261	0.28	98.58
10.00	0.261	0.28	98.86
11.00	0.261	0.28	99.15
12.00	0.261	0.28	99.43
13.00	0.261	0.28	99.72
14.00	0.261	0.28	100.00

Post-analytical weight: 91.82

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.43	2.70	2.79	2.95	3.16	3.24	3.58
		Percentages of:				
Gravel		Sand		Silt		Clay
0.02		96.78		1.50		1.70
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.96	0.31	0.08	1.28	0.56	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.95	2.97	0.27	0.06	0.19	1.13	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.74	1.23	2.98	41.56		

Cruise: Tampa Bay      Station: 3N      Sample: 4-6 cm  
Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.000	0.00	0.00
-1.00	0.011	0.01	0.01
-0.75	0.008	0.01	0.02
-0.50	0.033	0.04	0.06
-0.25	0.049	0.06	0.12
0.00	0.060	0.07	0.19
0.25	0.074	0.09	0.27
0.50	0.110	0.13	0.40
0.75	0.148	0.17	0.57
1.00	0.169	0.20	0.77
1.25	0.159	0.18	0.95
1.50	0.310	0.36	1.31
1.75	0.394	0.46	1.76
2.00	0.686	0.79	2.56
2.25	1.299	1.50	4.06
2.50	3.057	3.53	7.59
2.75	11.497	13.29	20.89
3.00	31.322	36.22	57.10
3.25	23.845	27.57	84.67
3.50	8.259	9.55	94.22
3.75	1.528	1.77	95.99
4.00	0.764	0.88	96.87
4.50	0.256	0.30	97.17
5.00	0.113	0.13	97.30
5.50	0.113	0.13	97.43
6.00	0.113	0.13	97.56
6.50	0.113	0.13	97.69
7.00	0.113	0.13	97.82
7.50	0.113	0.13	97.95
8.00	0.113	0.13	98.08
9.00	0.277	0.32	98.40
10.00	0.277	0.32	98.72
11.00	0.277	0.32	99.04
12.00	0.277	0.32	99.36
13.00	0.277	0.32	99.68
14.00	0.277	0.32	100.00

Post-analytical weight: 86.49

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	2.32	2.66	2.78	2.95	3.16	3.24	3.61
Percentages of:							
Gravel			Sand		Silt		Clay
0.01			96.86		1.21		1.92
Folk Values:							
	Mean	S.Dev.	Skew		Kurt	N.Kurt	
	2.95	0.34	0.01		1.38	0.58	
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.95	2.95	0.29	0.00	0.04	1.21		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.73	1.30	2.83	37.71			

Cruise: Tampa Bay      Station: 3N      Sample: 6-8 cm  
Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.043	0.05	0.05
-1.00	0.012	0.01	0.07
-0.75	0.030	0.04	0.10
-0.50	0.050	0.06	0.16
-0.25	0.048	0.06	0.22
0.00	0.053	0.06	0.28
0.25	0.079	0.09	0.38
0.50	0.106	0.13	0.51
0.75	0.110	0.13	0.64
1.00	0.134	0.16	0.80
1.25	0.119	0.14	0.94
1.50	0.292	0.35	1.29
1.75	0.359	0.43	1.72
2.00	0.766	0.92	2.64
2.25	1.345	1.61	4.26
2.50	3.345	4.02	8.27
2.75	11.841	14.22	22.49
3.00	30.587	36.72	59.21
3.25	22.186	26.63	85.84
3.50	7.213	8.66	94.50
3.75	1.305	1.57	96.07
4.00	0.597	0.72	96.78
4.50	0.240	0.29	97.07
5.00	0.125	0.15	97.22
5.50	0.125	0.15	97.37
6.00	0.125	0.15	97.52
6.50	0.125	0.15	97.67
7.00	0.125	0.15	97.82
7.50	0.125	0.15	97.97
8.00	0.125	0.15	98.12
9.00	0.261	0.31	98.44
10.00	0.261	0.31	98.75
11.00	0.261	0.31	99.06
12.00	0.261	0.31	99.37
13.00	0.261	0.31	99.69
14.00	0.261	0.31	100.00

Post-analytical weight: 83.30

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	2.30	2.64	2.77	2.94	3.15	3.23	3.58
Percentages of:							
Gravel			Sand		Silt		Clay
0.07			96.72		1.34		1.88
Folk Values:							
	Mean	S.Dev.	Skew	Kurt	N.Kurt		
	2.94	0.34	-0.00	1.38	0.58		
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.94	2.93	0.30	-0.01	0.00	1.15		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.72	1.30	2.78	37.21			

Cruise: Tampa Bay      Station: 3N      Sample: 8-10 cm  
 Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.010	0.01	0.01
-1.00	0.005	0.01	0.02
-0.75	0.024	0.03	0.04
-0.50	0.080	0.09	0.13
-0.25	0.052	0.06	0.19
0.00	0.101	0.11	0.30
0.25	0.132	0.15	0.45
0.50	0.163	0.18	0.63
0.75	0.196	0.22	0.85
1.00	0.196	0.22	1.07
1.25	0.159	0.18	1.24
1.50	0.365	0.41	1.65
1.75	0.470	0.52	2.17
2.00	0.928	1.03	3.20
2.25	1.499	1.67	4.87
2.50	3.889	4.32	9.19
2.75	12.990	14.43	23.62
3.00	34.279	38.08	61.69
3.25	22.128	24.58	86.27
3.50	7.630	8.48	94.75
3.75	1.402	1.56	96.31
4.00	0.777	0.86	97.17
4.50	0.236	0.26	97.43
5.00	0.100	0.11	97.54
5.50	0.100	0.11	97.65
6.00	0.100	0.11	97.76
6.50	0.100	0.11	97.87
7.00	0.100	0.11	97.99
7.50	0.100	0.11	98.10
8.00	0.100	0.11	98.21
9.00	0.269	0.30	98.51
10.00	0.269	0.30	98.80
11.00	0.269	0.30	99.10
12.00	0.269	0.30	99.40
13.00	0.269	0.30	99.70
14.00	0.269	0.30	100.00

Post-analytical weight: 90.02

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.26	2.62	2.76	2.92	3.14	3.23	3.54
Percentages of:						
Gravel	Sand		Silt		Clay	
0.02	97.15		1.04		1.79	
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.92	0.35	-0.02	1.40	0.58	
Inman values:						
	Median	Mean	S.Dev.	Skew	Skew2	Kurt
2.92	2.92	0.30	-0.00	-0.08	1.11	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.68	1.27	2.83	39.24		

Cruise: Tampa Bay      Station: 3N      Sample: 10-12 cm  
Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.000	0.00	0.00
-1.00	0.000	0.00	0.00
-0.75	0.037	0.04	0.04
-0.50	0.054	0.06	0.10
-0.25	0.056	0.06	0.15
0.00	0.080	0.08	0.24
0.25	0.165	0.17	0.41
0.50	0.190	0.20	0.61
0.75	0.244	0.26	0.87
1.00	0.298	0.31	1.18
1.25	0.257	0.27	1.46
1.50	0.482	0.51	1.96
1.75	0.451	0.48	2.44
2.00	0.840	0.89	3.32
2.25	1.542	1.63	4.95
2.50	3.270	3.45	8.40
2.75	12.146	12.80	21.20
3.00	34.366	36.23	57.43
3.25	25.387	26.76	84.19
3.50	8.975	9.46	93.65
3.75	1.761	1.86	95.51
4.00	0.919	0.97	96.48
4.50	0.357	0.38	96.86
5.00	0.181	0.19	97.05
5.50	0.181	0.19	97.24
6.00	0.181	0.19	97.43
6.50	0.181	0.19	97.62
7.00	0.181	0.19	97.81
7.50	0.181	0.19	98.00
8.00	0.181	0.19	98.19
9.00	0.286	0.30	98.49
10.00	0.286	0.30	98.80
11.00	0.286	0.30	99.10
12.00	0.286	0.30	99.40
13.00	0.286	0.30	99.70
14.00	0.286	0.30	100.00

Post-analytical weight: 94.86

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.25	2.65	2.78	2.95	3.16	3.25	3.68
Percentages of:						
Gravel		Sand		Silt		Clay
0.00		96.48		1.71		1.81
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.95	0.37	0.01	1.51	0.60	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.95	2.95	0.30	-0.00	0.06	1.38	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.73	1.30	2.67	35.40		

Cruise: Tampa Bay Station: 3N Sample: 12-14 cm  
Date: 9 Jan 03 Latitude: 27-57.854'N Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.018	0.02	0.02
-1.75	0.017	0.02	0.03
-1.50	0.013	0.01	0.05
-1.25	0.006	0.01	0.05
-1.00	0.026	0.02	0.08
-0.75	0.030	0.03	0.10
-0.50	0.060	0.06	0.16
-0.25	0.093	0.09	0.25
0.00	0.118	0.11	0.36
0.25	0.177	0.17	0.53
0.50	0.230	0.22	0.75
0.75	0.328	0.31	1.06
1.00	0.413	0.39	1.46
1.25	0.336	0.32	1.78
1.50	0.713	0.68	2.46
1.75	0.708	0.68	3.13
2.00	1.071	1.02	4.16
2.25	1.905	1.82	5.97
2.50	4.420	4.22	10.19
2.75	14.515	13.84	24.03
3.00	38.892	37.09	61.12
3.25	27.903	26.61	87.74
3.50	8.769	8.36	96.10
3.75	1.457	1.39	97.49
4.00	0.695	0.66	98.15
4.50	0.163	0.16	98.31
5.00	0.037	0.04	98.34
5.50	0.037	0.04	98.38
6.00	0.037	0.04	98.41
6.50	0.037	0.04	98.45
7.00	0.037	0.04	98.49
7.50	0.037	0.04	98.52
8.00	0.037	0.04	98.56
9.00	0.252	0.24	98.80
10.00	0.252	0.24	99.04
11.00	0.252	0.24	99.28
12.00	0.252	0.24	99.52
13.00	0.252	0.24	99.76
14.00	0.252	0.24	100.00

Post-analytical weight: 104.85

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	2.12	2.60	2.76	2.93	3.13	3.21	3.47
Percentages of:							
Gravel			Sand		Silt		Clay
0.08			98.07		0.41		1.44
Folk Values:							
	Mean	S.Dev.	Skew		Kurt		N.Kurt
	2.91	0.36	-0.12	1.48		0.60	
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2		Kurt	
2.93	2.91	0.30	-0.05	-0.44		1.21	
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.62	1.16	2.98	47.76			



Cruise: Tampa Bay      Station: 3N      Sample: 14-16 cm  
Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.027	0.03	0.03
-1.25	0.063	0.07	0.09
-1.00	0.078	0.08	0.17
-0.75	0.088	0.09	0.27
-0.50	0.148	0.15	0.42
-0.25	0.245	0.25	0.67
0.00	0.278	0.29	0.96
0.25	0.564	0.58	1.54
0.50	0.648	0.67	2.22
0.75	0.953	0.99	3.20
1.00	0.899	0.93	4.13
1.25	0.677	0.70	4.83
1.50	1.059	1.10	5.93
1.75	1.005	1.04	6.97
2.00	1.329	1.38	8.35
2.25	2.033	2.11	10.45
2.50	4.304	4.46	14.91
2.75	13.438	13.92	28.83
3.00	33.808	35.01	63.84
3.25	23.666	24.51	88.35
3.50	7.379	7.64	95.99
3.75	1.199	1.24	97.24
4.00	0.525	0.54	97.78
4.50	0.149	0.15	97.93
5.00	0.069	0.07	98.00
5.50	0.069	0.07	98.08
6.00	0.069	0.07	98.15
6.50	0.069	0.07	98.22
7.00	0.069	0.07	98.29
7.50	0.069	0.07	98.36
8.00	0.069	0.07	98.43
9.00	0.252	0.26	98.69
10.00	0.252	0.26	98.96
11.00	0.252	0.26	99.22
12.00	0.252	0.26	99.48
13.00	0.252	0.26	99.74
14.00	0.252	0.26	100.00

Post-analytical weight: 96.56

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	1.29	2.52	2.68	2.90	3.11	3.21	3.47
Percentages of:							
Gravel			Sand		Silt		Clay
0.17			97.61		0.65		1.57
Folk Values:							
	Mean	S.Dev.	Skew	Kurt	N.Kurt		
	2.88	0.50	-0.30	2.07	0.67		
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.90	2.86	0.34	-0.11	-1.53	2.18		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.53	1.30	2.27	33.56			

Cruise: Tampa Bay      Station: 3N      Sample: 16-18 cm  
Date: 9 Jan 03      Latitude: 27-57.854'N      Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.000	0.00	0.00
-1.00	0.000	0.00	0.00
-0.75	0.002	0.00	0.00
-0.50	0.001	0.00	0.00
-0.25	0.017	0.02	0.02
0.00	0.009	0.01	0.03
0.25	0.011	0.01	0.05
0.50	0.018	0.02	0.07
0.75	0.026	0.03	0.10
1.00	0.045	0.05	0.15
1.25	0.047	0.06	0.21
1.50	0.126	0.15	0.36
1.75	0.197	0.24	0.60
2.00	0.498	0.59	1.19
2.25	1.144	1.37	2.55
2.50	3.192	3.81	6.36
2.75	11.476	13.70	20.06
3.00	31.671	37.79	57.85
3.25	23.223	27.71	85.57
3.50	7.279	8.69	94.25
3.75	1.241	1.48	95.73
4.00	0.602	0.72	96.45
4.50	0.297	0.35	96.81
5.00	0.187	0.22	97.03
5.50	0.187	0.22	97.25
6.00	0.187	0.22	97.48
6.50	0.187	0.22	97.70
7.00	0.187	0.22	97.92
7.50	0.187	0.22	98.15
8.00	0.187	0.22	98.37
9.00	0.227	0.27	98.64
10.00	0.227	0.27	98.91
11.00	0.227	0.27	99.19
12.00	0.227	0.27	99.46
13.00	0.227	0.27	99.73
14.00	0.227	0.27	100.00

Post-analytical weight: 83.80

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.41	2.68	2.78	2.95	3.15	3.24	3.63
Percentages of:						
Gravel		Sand		Silt		Clay
0.00		96.45		1.92		1.63
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.95	0.32	0.07	1.34	0.57	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.95	2.96	0.28	0.03	0.25	1.17	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.75	1.22	3.02	41.67		

Cruise: Tampa Bay Station: 3N Sample: 18-20 cm  
Date: 9 Jan 03 Latitude: 27-57.854'N Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.000	0.00	0.00
-1.00	0.004	0.00	0.00
-0.75	0.012	0.01	0.02
-0.50	0.003	0.00	0.02
-0.25	0.012	0.01	0.04
0.00	0.006	0.01	0.04
0.25	0.032	0.04	0.08
0.50	0.048	0.06	0.14
0.75	0.070	0.08	0.22
1.00	0.095	0.11	0.33
1.25	0.107	0.13	0.46
1.50	0.254	0.30	0.75
1.75	0.430	0.50	1.26
2.00	0.875	1.03	2.28
2.25	1.799	2.11	4.39
2.50	4.319	5.06	9.46
2.75	13.499	15.83	25.28
3.00	32.024	37.54	62.83
3.25	21.300	24.97	87.80
3.50	6.058	7.10	94.90
3.75	1.054	1.24	96.14
4.00	0.527	0.62	96.75
4.50	0.236	0.28	97.03
5.00	0.131	0.15	97.19
5.50	0.131	0.15	97.34
6.00	0.131	0.15	97.49
6.50	0.131	0.15	97.65
7.00	0.131	0.15	97.80
7.50	0.131	0.15	97.95
8.00	0.131	0.15	98.11
9.00	0.269	0.32	98.42
10.00	0.269	0.32	98.74
11.00	0.269	0.32	99.05
12.00	0.269	0.32	99.37
13.00	0.269	0.32	99.68
14.00	0.269	0.32	100.00

Post-analytical weight: 85.30

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	2.28	2.60	2.75	2.91	3.12	3.21	3.52
Percentages of:							
Gravel			Sand		Silt		Clay
0.00			96.75		1.35		1.89
Folk Values:							
	Mean	S.Dev.	Skew		Kurt	N.Kurt	
	2.91	0.34	-0.02	1.35	0.57		
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.91	2.91	0.30	-0.02	-0.05	1.04		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.70	1.29	2.92	38.77			

Cruise: Tampa Bay Station: 3N Sample: 20-22 cm  
Date: 9 Jan 03 Latitude: 27-57.854'N Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.016	0.01	0.01
-1.00	0.031	0.03	0.04
-0.75	0.039	0.03	0.07
-0.50	0.144	0.12	0.19
-0.25	0.219	0.18	0.37
0.00	0.247	0.20	0.58
0.25	0.491	0.41	0.98
0.50	0.653	0.54	1.52
0.75	0.992	0.82	2.34
1.00	1.174	0.97	3.31
1.25	0.984	0.81	4.13
1.50	1.621	1.34	5.47
1.75	1.522	1.26	6.73
2.00	1.979	1.64	8.37
2.25	2.974	2.46	10.83
2.50	5.941	4.92	15.74
2.75	18.366	15.20	30.94
3.00	42.620	35.26	66.20
3.25	27.362	22.64	88.84
3.50	7.920	6.55	95.40
3.75	1.430	1.18	96.58
4.00	0.707	0.58	97.17
4.50	0.318	0.26	97.43
5.00	0.156	0.13	97.56
5.50	0.156	0.13	97.69
6.00	0.156	0.13	97.82
6.50	0.156	0.13	97.95
7.00	0.156	0.13	98.08
7.50	0.156	0.13	98.20
8.00	0.156	0.13	98.33
9.00	0.336	0.28	98.61
10.00	0.336	0.28	98.89
11.00	0.336	0.28	99.17
12.00	0.336	0.28	99.44
13.00	0.336	0.28	99.72
14.00	0.336	0.28	100.00

Post-analytical weight: 120.86

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	1.41	2.50	2.65	2.89	3.10	3.20	3.48
Percentages of:							
Gravel			Sand		Silt		Clay
0.04			97.13		1.17		1.67
Folk Values:							
	Mean	S.Dev.	Skew		Kurt	N.Kurt	
	2.86	0.49	-0.26	1.91	0.66		
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.89	2.85	0.35	-0.10	-1.26	1.99		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.55	1.32	2.37	32.70			

Cruise: Tampa Bay Station: 3N Sample: 22-24 cm  
Date: 9 Jan 03 Latitude: 27-57.854'N Longitude: 83-02.755'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.051	0.05	0.05
-1.00	0.096	0.10	0.15
-0.75	0.149	0.15	0.30
-0.50	0.269	0.28	0.58
-0.25	0.422	0.43	1.02
0.00	0.536	0.55	1.57
0.25	0.872	0.90	2.46
0.50	1.059	1.09	3.55
0.75	1.401	1.44	4.99
1.00	1.485	1.53	6.52
1.25	1.032	1.06	7.58
1.50	1.738	1.79	9.37
1.75	1.470	1.51	10.88
2.00	1.877	1.93	12.81
2.25	2.617	2.69	15.51
2.50	4.823	4.96	20.47
2.75	13.883	14.28	34.75
3.00	32.471	33.40	68.15
3.25	21.002	21.60	89.75
3.50	5.871	6.04	95.79
3.75	1.027	1.06	96.84
4.00	0.494	0.51	97.35
4.50	0.216	0.22	97.57
5.00	0.106	0.11	97.68
5.50	0.106	0.11	97.79
6.00	0.106	0.11	97.90
6.50	0.106	0.11	98.01
7.00	0.106	0.11	98.12
7.50	0.106	0.11	98.23
8.00	0.106	0.11	98.34
9.00	0.269	0.28	98.62
10.00	0.269	0.28	98.89
11.00	0.269	0.28	99.17
12.00	0.269	0.28	99.45
13.00	0.269	0.28	99.72
14.00	0.269	0.28	100.00

Post-analytical weight: 97.22

Phi size at percentage levels:							
	5	16	25	50	75	84	95
0.75	2.27	2.58	2.86	3.08	3.18	3.47	
Percentages of:							
Gravel		Sand		Silt		Clay	
0.15		97.20		0.99		1.66	
Folk Values:							
	Mean	S.Dev.	Skew	Kurt	N.Kurt		
	2.77	0.64	-0.43	2.23	0.69		
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.86	2.73	0.45	-0.30	-1.66	1.99		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.44	1.41	1.93	26.40			

Cruise: Tampa Bay Station: 10S Sample: 0-2 cm  
Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83.03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.022	0.03	0.03
-1.25	0.004	0.00	0.03
-1.00	0.039	0.05	0.08
-0.75	0.069	0.08	0.16
-0.50	0.088	0.11	0.27
-0.25	0.092	0.11	0.39
0.00	0.105	0.13	0.51
0.25	0.131	0.16	0.67
0.50	0.172	0.21	0.89
0.75	0.188	0.23	1.12
1.00	0.192	0.24	1.35
1.25	0.169	0.21	1.56
1.50	0.378	0.46	2.02
1.75	0.433	0.53	2.55
2.00	0.683	0.84	3.39
2.25	1.429	1.75	5.15
2.50	3.724	4.57	9.71
2.75	11.440	14.04	23.75
3.00	29.421	36.10	59.85
3.25	18.539	22.75	82.59
3.50	9.102	11.17	93.76
3.75	1.712	2.10	95.86
4.00	1.040	1.28	97.14
4.50	0.343	0.42	97.56
5.00	0.125	0.15	97.71
5.50	0.125	0.15	97.87
6.00	0.125	0.15	98.02
6.50	0.125	0.15	98.17
7.00	0.125	0.15	98.33
7.50	0.125	0.15	98.48
8.00	0.125	0.15	98.63
9.00	0.186	0.23	98.86
10.00	0.186	0.23	99.09
11.00	0.186	0.23	99.32
12.00	0.186	0.23	99.54
13.00	0.186	0.23	99.77
14.00	0.186	0.23	100.00

Post-analytical weight: 81.50

Phi size at percentage levels:							
	5	16	25	50	75	84	95
	2.23	2.61	2.76	2.93	3.17	3.28	3.65
Percentages of:							
Gravel			Sand		Silt		Clay
0.08			97.06		1.50		1.37
Folk Values:							
	Mean	S.Dev.	Skew		Kurt	N.Kurt	
	2.94	0.38	0.03		1.42	0.59	
Inman values:							
Median	Mean	S.Dev.	Skew	Skew2	Kurt		
2.93	2.95	0.33	0.04	0.02	1.12		
Moment measures:							
	Mean	S.Dev.	Skew	KG			
	2.67	1.18	2.73	41.60			

Cruise: Tampa Bay Station: 10S Sample: 2-4 cm  
Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83-03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.008	0.01	0.01
-1.25	0.048	0.05	0.06
-1.00	0.080	0.08	0.14
-0.75	0.044	0.05	0.19
-0.50	0.130	0.13	0.32
-0.25	0.159	0.16	0.48
0.00	0.178	0.18	0.67
0.25	0.272	0.28	0.95
0.50	0.324	0.33	1.28
0.75	0.329	0.34	1.62
1.00	0.344	0.36	1.98
1.25	0.301	0.31	2.29
1.50	0.631	0.65	2.94
1.75	0.803	0.83	3.77
2.00	1.087	1.12	4.89
2.25	2.632	2.72	7.61
2.50	10.137	10.47	18.07
2.75	28.735	29.66	47.74
3.00	31.071	32.08	79.81
3.25	10.411	10.75	90.56
3.50	4.591	4.74	95.30
3.75	1.190	1.23	96.53
4.00	0.623	0.64	97.17
4.50	0.286	0.30	97.47
5.00	0.162	0.17	97.64
5.50	0.162	0.17	97.80
6.00	0.162	0.17	97.97
6.50	0.162	0.17	98.14
7.00	0.162	0.17	98.31
7.50	0.162	0.17	98.48
8.00	0.162	0.17	98.64
9.00	0.219	0.23	98.87
10.00	0.219	0.23	99.10
11.00	0.219	0.23	99.32
12.00	0.219	0.23	99.55
13.00	0.219	0.23	99.77
14.00	0.219	0.23	100.00

Post-analytical weight: 96.87

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.01	2.45	2.56	2.77	2.96	3.10	3.48
		Percentages of:				
Gravel		Sand		Silt		Clay
0.14		97.03		1.47		1.36
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.77	0.39	-0.00	1.49	0.60	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.77	2.77	0.32	0.02	-0.06	1.28	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.49	1.21	2.64	39.59		



Cruise: Tampa Bay Station: 10S Sample: 4-6 cm  
Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83.03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.008	0.01	0.01
-1.50	0.000	0.00	0.01
-1.25	0.041	0.04	0.05
-1.00	0.020	0.02	0.07
-0.75	0.058	0.06	0.13
-0.50	0.079	0.08	0.21
-0.25	0.142	0.15	0.36
0.00	0.144	0.15	0.51
0.25	0.192	0.20	0.71
0.50	0.209	0.22	0.92
0.75	0.224	0.23	1.15
1.00	0.262	0.27	1.42
1.25	0.220	0.23	1.65
1.50	0.539	0.56	2.21
1.75	0.589	0.61	2.82
2.00	1.020	1.05	3.87
2.25	1.971	2.04	5.91
2.50	4.575	4.73	10.63
2.75	13.374	13.82	24.45
3.00	30.059	31.05	55.50
3.25	23.360	24.13	79.63
3.50	10.043	10.38	90.01
3.75	2.493	2.58	92.59
4.00	1.722	1.78	94.36
4.50	0.808	0.83	95.20
5.00	0.366	0.38	95.58
5.50	0.366	0.38	95.96
6.00	0.366	0.38	96.33
6.50	0.366	0.38	96.71
7.00	0.366	0.38	97.09
7.50	0.366	0.38	97.47
8.00	0.366	0.38	97.85
9.00	0.347	0.36	98.21
10.00	0.347	0.36	98.56
11.00	0.347	0.36	98.92
12.00	0.347	0.36	99.28
13.00	0.347	0.36	99.64
14.00	0.347	0.36	100.00

Post-analytical weight: 96.80

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.14	2.60	2.75	2.96	3.20	3.36	4.38
Gravel 0.07	Percentages of:					
	Sand			Silt	Clay	
	94.29			3.48	2.15	
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.97	0.53	0.16	2.05	0.67	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.96	2.98	0.38	0.05	0.80	1.96	
Moment measures:						
	Mean	S.Dev.	Skew	KG		
	2.79	1.47	2.21	24.83		

Cruise: Tampa Bay Station: 10S Sample: 6-8 cm  
Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83.03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.013	0.01	0.01
-1.00	0.026	0.03	0.04
-0.75	0.040	0.04	0.08
-0.50	0.094	0.09	0.17
-0.25	0.091	0.09	0.26
0.00	0.129	0.13	0.38
0.25	0.195	0.19	0.57
0.50	0.186	0.18	0.76
0.75	0.219	0.21	0.97
1.00	0.222	0.22	1.19
1.25	0.206	0.20	1.39
1.50	0.436	0.43	1.81
1.75	0.589	0.58	2.39
2.00	0.867	0.85	3.24
2.25	1.865	1.82	5.06
2.50	4.874	4.76	9.82
2.75	13.440	13.13	22.95
3.00	39.733	38.81	61.76
3.25	22.231	21.72	83.48
3.50	9.588	9.37	92.85
3.75	1.814	1.77	94.62
4.00	1.172	1.14	95.76
4.50	0.487	0.48	96.24
5.00	0.262	0.26	96.50
5.50	0.262	0.26	96.75
6.00	0.262	0.26	97.01
6.50	0.262	0.26	97.26
7.00	0.262	0.26	97.52
7.50	0.262	0.26	97.78
8.00	0.262	0.26	98.03
9.00	0.336	0.33	98.36
10.00	0.336	0.33	98.69
11.00	0.336	0.33	99.02
12.00	0.336	0.33	99.34
13.00	0.336	0.33	99.67
14.00	0.336	0.33	100.00

Post-analytical weight: 102.37

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.24	2.62	2.76	2.92	3.15	3.26	3.83
Percentages of:						
Gravel	Sand		Silt		Clay	
0.04	95.72		2.27		1.97	
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.94	0.40	0.10	1.68	0.63	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.92	2.94	0.32	0.05	0.35	1.46	
Moment measures:						
	Mean	S.Dev.	Skew	KG		

2.74 1.37 2.49 30.86  
 Cruise: Tampa Bay Station: 10S Sample: 8-10 cm  
 Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83.03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.012	0.01	0.01
-1.25	0.021	0.02	0.03
-1.00	0.049	0.05	0.08
-0.75	0.085	0.08	0.16
-0.50	0.125	0.12	0.28
-0.25	0.178	0.17	0.45
0.00	0.161	0.15	0.61
0.25	0.227	0.22	0.83
0.50	0.237	0.23	1.05
0.75	0.254	0.24	1.30
1.00	0.262	0.25	1.55
1.25	0.232	0.22	1.77
1.50	0.467	0.45	2.22
1.75	0.559	0.54	2.76
2.00	0.898	0.86	3.62
2.25	1.789	1.72	5.35
2.50	4.819	4.64	9.98
2.75	14.398	13.86	23.84
3.00	33.752	32.48	56.32
3.25	27.183	26.16	82.48
3.50	10.488	10.09	92.57
3.75	2.289	2.20	94.77
4.00	1.183	1.14	95.91
4.50	0.449	0.43	96.34
5.00	0.263	0.25	96.59
5.50	0.263	0.25	96.85
6.00	0.263	0.25	97.10
6.50	0.263	0.25	97.35
7.00	0.263	0.25	97.61
7.50	0.263	0.25	97.86
8.00	0.263	0.25	98.11
9.00	0.327	0.31	98.43
10.00	0.327	0.31	98.74
11.00	0.327	0.31	99.06
12.00	0.327	0.31	99.37
13.00	0.327	0.31	99.69
14.00	0.327	0.31	100.00

Post-analytical weight: 103.92

Phi size at percentage levels:  
 5 16 25 50 75 84 95  
 2.20 2.61 2.76 2.95 3.18 3.29 3.80  
 Percentages of:  
 Gravel Sand Silt Clay  
 0.08 95.83 2.20 1.89  
 Folk Values:  
 Mean S.Dev. Skew Kurt N.Kurt  
 2.95 0.41 0.03 1.56 0.61  
 Inman values:  
 Median Mean S.Dev. Skew Skew2 Kurt  
 2.95 2.95 0.34 -0.01 0.14 1.36  
 Moment measures:  
 Mean S.Dev. Skew KG

2.73 1.37 2.41 30.40  
 Cruise: Tampa Bay Station: 10S Sample: 10-12 cm  
 Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83.03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.038	0.05	0.05
-1.00	0.042	0.05	0.10
-0.75	0.058	0.07	0.17
-0.50	0.085	0.10	0.27
-0.25	0.082	0.10	0.37
0.00	0.106	0.13	0.50
0.25	0.146	0.18	0.67
0.50	0.164	0.20	0.87
0.75	0.167	0.20	1.07
1.00	0.187	0.23	1.30
1.25	0.159	0.19	1.49
1.50	0.346	0.42	1.91
1.75	0.437	0.53	2.43
2.00	0.765	0.92	3.36
2.25	1.604	1.94	5.29
2.50	4.052	4.89	10.18
2.75	11.388	13.74	23.92
3.00	27.277	32.91	56.83
3.25	20.469	24.70	81.53
3.50	8.496	10.25	91.78
3.75	1.857	2.24	94.02
4.00	1.039	1.25	95.27
4.50	0.417	0.50	95.78
5.00	0.263	0.32	96.09
5.50	0.263	0.32	96.41
6.00	0.263	0.32	96.73
6.50	0.263	0.32	97.04
7.00	0.263	0.32	97.36
7.50	0.263	0.32	97.68
8.00	0.263	0.32	97.99
9.00	0.277	0.33	98.33
10.00	0.277	0.33	98.66
11.00	0.277	0.33	99.00
12.00	0.277	0.33	99.33
13.00	0.277	0.33	99.67
14.00	0.277	0.33	100.00

Post-analytical weight: 82.88

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.21	2.61	2.76	2.95	3.18	3.31	3.95
Percentages of:						
Gravel	Sand		Silt		Clay	
0.10	95.18		2.72		2.01	
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.95	0.44	0.09	1.67	0.63	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.95	2.96	0.35	0.03	0.37	1.46	
Moment measures:						
	Mean	S.Dev.	Skew	KG		

2.76 1.41 2.35 28.10  
 Cruise: Tampa Bay Station: 10S Sample: 12-14 cm  
 Date: 13 Jan 03 Latitude: 27-58.198'N Longitude: 83.03.297'W

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.000	0.00	0.00
-1.25	0.042	0.04	0.04
-1.00	0.076	0.07	0.11
-0.75	0.084	0.08	0.20
-0.50	0.116	0.11	0.31
-0.25	0.160	0.16	0.46
0.00	0.172	0.17	0.63
0.25	0.242	0.23	0.86
0.50	0.298	0.29	1.15
0.75	0.333	0.32	1.48
1.00	0.315	0.31	1.78
1.25	0.297	0.29	2.07
1.50	0.535	0.52	2.59
1.75	0.659	0.64	3.23
2.00	1.026	0.99	4.22
2.25	2.129	2.06	6.29
2.50	5.096	4.94	11.23
2.75	14.876	14.42	25.65
3.00	34.548	33.50	59.15
3.25	24.539	23.79	82.95
3.50	9.873	9.57	92.52
3.75	2.049	1.99	94.51
4.00	1.237	1.20	95.71
4.50	0.496	0.48	96.19
5.00	0.281	0.27	96.46
5.50	0.281	0.27	96.73
6.00	0.281	0.27	97.00
6.50	0.281	0.27	97.28
7.00	0.281	0.27	97.55
7.50	0.281	0.27	97.82
8.00	0.281	0.27	98.10
9.00	0.327	0.32	98.41
10.00	0.327	0.32	98.73
11.00	0.327	0.32	99.05
12.00	0.327	0.32	99.37
13.00	0.327	0.32	99.68
14.00	0.327	0.32	100.00

Post-analytical weight: 103.13

Phi size at percentage levels:						
5	16	25	50	75	84	95
2.09	2.58	2.74	2.93	3.17	3.28	3.85
Percentages of:						
Gravel	Sand		Silt		Clay	
0.11	95.59		2.39		1.90	
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	2.93	0.44	0.02	1.68	0.63	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
2.93	2.93	0.35	-0.00	0.12	1.53	
Moment measures:						
	Mean	S.Dev.	Skew	KG		

2.71 1.39 2.33 28.94  
 Cruise: Tampa Bay Station: TB 11 Sample: 0-2 cm  
 Date: 10 Jan 03 Latitude: 27-58.088' Longitude: 83-02.936'

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.000	0.00	0.00
-1.50	0.066	0.08	0.08
-1.25	0.036	0.04	0.12
-1.00	0.050	0.06	0.18
-0.75	0.220	0.25	0.43
-0.50	0.825	0.95	1.38
-0.25	3.130	3.62	5.00
0.00	6.904	7.98	12.98
0.25	16.374	18.93	31.91
0.50	18.775	21.70	53.61
0.75	14.136	16.34	69.95
1.00	7.833	9.05	79.00
1.25	3.548	4.10	83.10
1.50	3.192	3.69	86.79
1.75	1.795	2.07	88.87
2.00	1.265	1.46	90.33
2.25	0.996	1.15	91.48
2.50	0.830	0.96	92.44
2.75	0.927	1.07	93.51
3.00	1.173	1.36	94.87
3.25	0.677	0.78	95.65
3.50	0.315	0.36	96.01
3.75	0.129	0.15	96.16
4.00	0.148	0.17	96.33
4.50	0.208	0.24	96.57
5.00	0.150	0.17	96.75
5.50	0.150	0.17	96.92
6.00	0.150	0.17	97.09
6.50	0.150	0.17	97.27
7.00	0.150	0.17	97.44
7.50	0.150	0.17	97.61
8.00	0.150	0.17	97.79
9.00	0.319	0.37	98.16
10.00	0.319	0.37	98.53
11.00	0.319	0.37	98.89
12.00	0.319	0.37	99.26
13.00	0.319	0.37	99.63
14.00	0.319	0.37	100.00

Post-analytical weight: 86.52

Phi size at percentage levels:						
5	16	25	50	75	84	95
-0.25	0.04	0.16	0.46	0.89	1.31	3.04
Percentages of:						
Gravel		Sand		Silt		Clay
0.18		96.16		1.45		2.21
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	0.60	0.82	0.46	1.85	0.65	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
0.46	0.68	0.64	0.34	1.48	1.59	
Moment measures:						
	Mean	S.Dev.	Skew	KG		

0.54 1.87 2.26 23.17  
 Cruise: Tampa Bay Station: TB 11 Sample: 2-4 cm  
 Date: 10 Jan 03 Latitude: 27-58.088' Longitude: 83-02.936'

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.164	0.18	0.18
-2.00	0.050	0.05	0.23
-1.75	0.000	0.00	0.23
-1.50	0.112	0.12	0.36
-1.25	0.194	0.21	0.57
-1.00	0.487	0.53	1.10
-0.75	0.961	1.05	2.15
-0.50	2.751	3.01	5.16
-0.25	7.670	8.39	13.55
0.00	11.530	12.61	26.16
0.25	19.518	21.35	47.51
0.50	16.239	17.76	65.28
0.75	10.216	11.18	76.45
1.00	5.598	6.12	82.58
1.25	2.421	2.65	85.22
1.50	2.609	2.85	88.08
1.75	1.554	1.70	89.78
2.00	1.219	1.33	91.11
2.25	1.026	1.12	92.23
2.50	0.938	1.03	93.26
2.75	1.055	1.15	94.41
3.00	1.357	1.48	95.90
3.25	0.711	0.78	96.68
3.50	0.315	0.34	97.02
3.75	0.135	0.15	97.17
4.00	0.131	0.14	97.31
4.50	0.150	0.16	97.48
5.00	0.106	0.12	97.59
5.50	0.106	0.12	97.71
6.00	0.106	0.12	97.82
6.50	0.106	0.12	97.94
7.00	0.106	0.12	98.06
7.50	0.106	0.12	98.17
8.00	0.106	0.12	98.29
9.00	0.261	0.29	98.57
10.00	0.261	0.29	98.86
11.00	0.261	0.29	99.14
12.00	0.261	0.29	99.43
13.00	0.261	0.29	99.71
14.00	0.261	0.29	100.00

Post-analytical weight: 91.42

Phi size at percentage levels:						
5	16	25	50	75	84	95
-0.51	-0.20	-0.02	0.28	0.72	1.13	2.85
Percentages of:						
Gravel	Sand		Silt		Clay	
1.10	96.21		0.98		1.71	
Folk Values:						
	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	0.41	0.84	0.40	1.86	0.65	
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
0.28	0.47	0.67	0.27	1.32	1.52	
Moment measures:						



Mean S.Dev. Skew KG  
 0.29 1.74 2.35 26.98  
 Cruise: Tampa Bay Station: TB 11 Sample: 4-6 cm  
 Date: 10 Jan 03 Latitude: 27-58.088' Longitude: 83-02.936'

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.093	0.10	0.10
-2.25	0.150	0.17	0.27
-2.00	0.147	0.17	0.44
-1.75	0.212	0.24	0.68
-1.50	0.397	0.45	1.12
-1.25	0.810	0.91	2.04
-1.00	1.036	1.17	3.20
-0.75	1.784	2.01	5.21
-0.50	4.170	4.69	9.90
-0.25	8.153	9.17	19.08
0.00	9.891	11.13	30.21
0.25	15.594	17.55	47.75
0.50	12.820	14.43	62.18
0.75	8.350	9.40	71.58
1.00	5.258	5.92	77.49
1.25	2.363	2.66	80.15
1.50	2.913	3.28	83.43
1.75	1.862	2.10	85.53
2.00	1.648	1.85	87.38
2.25	1.520	1.71	89.09
2.50	1.423	1.60	90.69
2.75	1.683	1.89	92.59
3.00	2.167	2.44	95.02
3.25	1.104	1.24	96.27
3.50	0.467	0.53	96.79
3.75	0.166	0.19	96.98
4.00	0.160	0.18	97.16
4.50	0.174	0.20	97.35
5.00	0.112	0.13	97.48
5.50	0.112	0.13	97.61
6.00	0.112	0.13	97.73
6.50	0.112	0.13	97.86
7.00	0.112	0.13	97.99
7.50	0.112	0.13	98.11
8.00	0.112	0.13	98.24
9.00	0.261	0.29	98.53
10.00	0.261	0.29	98.83
11.00	0.261	0.29	99.12
12.00	0.261	0.29	99.41
13.00	0.261	0.29	99.71
14.00	0.261	0.29	100.00

Post-analytical weight: 88.87

Phi size at percentage levels:						
5	16	25	50	75	84	95
-0.78	-0.33	-0.12	0.29	0.89	1.57	3.00
Percentages of:						
Gravel	Sand		Silt		Clay	
3.20	93.96		1.08		1.76	
Folk Values:						
0.51	Mean	S.Dev.	Skew	Kurt	N.Kurt	
	1.05	0.39	1.53	0.60		
Inman values:						
Median	Mean	S.Dev.	Skew	Skew2	Kurt	
0.29	0.62	0.95	0.35	0.86	0.98	

Moment measures:  
 Mean S.Dev. Skew KG  
 0.34 1.84 1.99 20.97  
 Cruise: Tampa Bay Station: TB 11 Sample: 6-8 cm  
 Date: 10 Jan 03 Latitude: 27-58.088' Longitude: 83-02.936'

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.241	0.27	0.27
-2.50	0.000	0.00	0.27
-2.25	0.000	0.00	0.27
-2.00	0.377	0.42	0.68
-1.75	0.511	0.57	1.25
-1.50	0.904	1.00	2.25
-1.25	1.925	2.13	4.38
-1.00	2.052	2.27	6.66
-0.75	3.052	3.38	10.04
-0.50	5.811	6.44	16.47
-0.25	8.863	9.82	26.29
0.00	9.827	10.88	37.18
0.25	13.409	14.85	52.03
0.50	11.036	12.22	64.25
0.75	7.455	8.26	72.51
1.00	4.398	4.87	77.38
1.25	2.049	2.27	79.65
1.50	2.516	2.79	82.44
1.75	1.686	1.87	84.30
2.00	1.460	1.62	85.92
2.25	1.435	1.59	87.51
2.50	1.150	1.27	88.78
2.75	2.225	2.46	91.25
3.00	2.542	2.82	94.06
3.25	1.311	1.45	95.52
3.50	0.591	0.65	96.17
3.75	0.200	0.22	96.39
4.00	0.164	0.18	96.57
4.50	0.255	0.28	96.86
5.00	0.175	0.19	97.05
5.50	0.175	0.19	97.24
6.00	0.175	0.19	97.44
6.50	0.175	0.19	97.63
7.00	0.175	0.19	97.82
7.50	0.175	0.19	98.02
8.00	0.175	0.19	98.21
9.00	0.269	0.30	98.51
10.00	0.269	0.30	98.81
11.00	0.269	0.30	99.11
12.00	0.269	0.30	99.40
13.00	0.269	0.30	99.70
14.00	0.269	0.30	100.00

Post-analytical weight: 90.28

Phi size at percentage levels:

5	16	25	50	75	84	95
-1.18	-0.52	-0.28	0.22	0.88	1.71	3.16

Percentages of:

Gravel	Sand	Silt	Clay
6.66	89.92	1.64	1.79

Folk Values:

Mean	S.Dev.	Skew	Kurt	N.Kurt
0.47	1.22	0.35	1.53	0.61

Inman values:

Median	Mean	S.Dev.	Skew	Skew2	Kurt
--------	------	--------	------	-------	------

0.22 0.60 1.11 0.34 0.69 0.95  
 Moment measures:  
 Mean S.Dev. Skew KG  
 0.28 1.97 1.74 16.68  
 Cruise: Tampa Bay Station: TB11 Sample: 8-10 cm  
 Date: 10 Jan 03 Latitude: 27-58.088' Longitude: 83-02.936'

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.270	0.24	0.24
-2.75	0.229	0.21	0.45
-2.50	0.000	0.00	0.45
-2.25	0.000	0.00	0.45
-2.00	0.172	0.15	0.60
-1.75	0.574	0.52	1.12
-1.50	0.706	0.64	1.76
-1.25	1.018	0.92	2.67
-1.00	0.867	0.78	3.45
-0.75	1.641	1.48	4.93
-0.50	3.112	2.80	7.73
-0.25	5.506	4.96	12.69
0.00	7.324	6.60	19.29
0.25	13.333	12.01	31.29
0.50	13.388	12.06	43.35
0.75	10.859	9.78	53.13
1.00	7.818	7.04	60.17
1.25	4.169	3.75	63.92
1.50	5.058	4.55	68.48
1.75	3.709	3.34	71.81
2.00	3.310	2.98	74.80
2.25	3.208	2.89	77.68
2.50	3.324	2.99	80.68
2.75	4.071	3.67	84.34
3.00	4.937	4.45	88.79
3.25	2.403	2.16	90.95
3.50	1.248	1.12	92.08
3.75	0.550	0.50	92.57
4.00	0.575	0.52	93.09
4.50	0.711	0.64	93.73
5.00	0.550	0.50	94.22
5.50	0.550	0.50	94.72
6.00	0.550	0.50	95.22
6.50	0.550	0.50	95.71
7.00	0.550	0.50	96.21
7.50	0.550	0.50	96.70
8.00	0.550	0.50	97.20
9.00	0.519	0.47	97.66
10.00	0.519	0.47	98.13
11.00	0.519	0.47	98.60
12.00	0.519	0.47	99.07
13.00	0.519	0.47	99.53
14.00	0.519	0.47	100.00

Post-analytical weight: 111.05

Phi size at percentage levels:  
 5 16 25 50 75 84 95  
 -0.74 -0.12 0.12 0.67 2.02 2.73 5.78  
 Percentages of:  
 Gravel Sand Silt Clay  
 3.45 89.64 4.11 2.80  
 Folk Values:  
 Mean S.Dev. Skew Kurt N.Kurt  
 1.09 1.70 0.50 1.41 0.58  
 Inman values:  
 Median Mean S.Dev. Skew Skew2 Kurt

0.67 1.30 1.43 0.44 1.30 1.29  
 Moment measures:  
 Mean S.Dev. Skew KG  
 0.98 2.33 1.35 9.46  
 Cruise: Tampa Bay Station: TB 11 Sample: 12-14 cm  
 Date: 10 Jan 03 Latitude: 27-58.088 Longitude: 83-02.936

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.000	0.00	0.00
-2.00	0.000	0.00	0.00
-1.75	0.036	0.04	0.04
-1.50	0.082	0.09	0.13
-1.25	0.315	0.35	0.48
-1.00	0.255	0.28	0.76
-0.75	0.282	0.31	1.07
-0.50	0.503	0.56	1.63
-0.25	0.938	1.04	2.67
0.00	1.103	1.22	3.89
0.25	1.570	1.74	5.63
0.50	1.607	1.78	7.42
0.75	1.355	1.50	8.92
1.00	0.998	1.11	10.02
1.25	0.617	0.68	10.71
1.50	0.906	1.00	11.71
1.75	0.849	0.94	12.65
2.00	1.164	1.29	13.94
2.25	1.939	2.15	16.09
2.50	3.987	4.42	20.51
2.75	14.154	15.69	36.20
3.00	27.878	30.90	67.09
3.25	16.277	18.04	85.13
3.50	6.768	7.50	92.63
3.75	1.762	1.95	94.58
4.00	1.089	1.21	95.79
4.50	0.489	0.54	96.33
5.00	0.223	0.25	96.58
5.50	0.223	0.25	96.83
6.00	0.223	0.25	97.07
6.50	0.223	0.25	97.32
7.00	0.223	0.25	97.57
7.50	0.223	0.25	97.82
8.00	0.223	0.25	98.06
9.00	0.291	0.32	98.39
10.00	0.291	0.32	98.71
11.00	0.291	0.32	99.03
12.00	0.291	0.32	99.35
13.00	0.291	0.32	99.68
14.00	0.291	0.32	100.00

Post-analytical weight: 90.23

Phi size at percentage levels:  
 5 16 25 50 75 84 95  
 0.16 2.24 2.57 2.86 3.11 3.23 3.84  
 Percentages of:  
 Gravel Sand Silt Clay  
 0.76 95.03 2.27 1.94  
 Folk Values:  
 Mean S.Dev. Skew Kurt N.Kurt  
 2.78 0.81 -0.36 2.80 0.74  
 Inman values:  
 Median Mean S.Dev. Skew Skew2 Kurt

2.86 2.74 0.50 -0.25 -1.74 2.70  
 Moment measures:  
 Mean S.Dev. Skew KG  
 2.43 1.64 1.39 16.70  
 Cruise: Tampa Bay Station: TB 11 Sample: 14-16 cm  
 Date: 10 Jan 03 Latitude: 27-58.088 Longitude: 83-02.936

Phi Size	Frac. Wgt.	Frac. %	Cum. %
-4.00	0.000	0.00	0.00
-3.75	0.000	0.00	0.00
-3.50	0.000	0.00	0.00
-3.25	0.000	0.00	0.00
-3.00	0.000	0.00	0.00
-2.75	0.000	0.00	0.00
-2.50	0.000	0.00	0.00
-2.25	0.031	0.03	0.03
-2.00	0.152	0.15	0.18
-1.75	0.000	0.00	0.18
-1.50	0.028	0.03	0.21
-1.25	0.101	0.10	0.31
-1.00	0.120	0.12	0.43
-0.75	0.210	0.21	0.63
-0.50	0.389	0.38	1.02
-0.25	0.633	0.62	1.64
0.00	0.888	0.88	2.52
0.25	1.445	1.43	3.95
0.50	1.470	1.45	5.40
0.75	1.308	1.29	6.69
1.00	1.020	1.01	7.70
1.25	0.631	0.62	8.32
1.50	1.057	1.04	9.36
1.75	0.989	0.98	10.34
2.00	1.310	1.29	11.63
2.25	2.241	2.21	13.84
2.50	5.366	5.30	19.14
2.75	22.034	21.75	40.89
3.00	32.201	31.79	72.68
3.25	14.133	13.95	86.64
3.50	5.591	5.52	92.16
3.75	1.643	1.62	93.78
4.00	1.138	1.12	94.90
4.50	0.594	0.59	95.49
5.00	0.344	0.34	95.83
5.50	0.344	0.34	96.17
6.00	0.344	0.34	96.51
6.50	0.344	0.34	96.85
7.00	0.344	0.34	97.18
7.50	0.344	0.34	97.52
8.00	0.344	0.34	97.86
9.00	0.361	0.36	98.22
10.00	0.361	0.36	98.58
11.00	0.361	0.36	98.93
12.00	0.361	0.36	99.29
13.00	0.361	0.36	99.64
14.00	0.361	0.36	100.00

Post-analytical weight: 101.29

Phi size at percentage levels:  
 5 16 25 50 75 84 95  
 0.43 2.35 2.57 2.82 3.04 3.20 4.08  
 Percentages of:  
 Gravel Sand Silt Clay  
 0.43 94.48 2.96 2.14  
 Folk Values:  
 Mean S.Dev. Skew Kurt N.Kurt  
 2.79 0.77 -0.21 3.16 0.76  
 Inman values:  
 Median Mean S.Dev. Skew Skew2 Kurt

2.82	2.78	0.43	-0.10	-1.33	3.29
		Moment measures:			
	Mean	S.Dev.	Skew	KG	
	2.50	1.64	1.58	17.66	

*Appendix 6.*  
*Notes by FWG Personnel:*

**Indian Rocks Beach/FL, January-March 2003, FWG- Burial Registration Mines**

1. **Mine:** 9 (Bösemine)/ No. 185 – **Instrumented Mine F5**  
**Batteries installed:** 11 October 02 / 12.93 V.  
**Measurement cycle:** 15 min.  
**Position:** 27°57.817'N / 83°02.715'W.  
**Water depth:** 12.3 m.  
**Sediment:** Fine sand.  
**Start of recording:** 11 January 03 / 11:47 (local time, ET).  
**Deployment of mine:** 11 January 03 / 18:50 (local time, ET).  
**First recording on sea floor:** 11 January 03 / 19:02 (local time, ET).  
**Re-orientation of mine:** No information from protocol. Data indicate no re-orientation.  
**Last recording on sea floor:** 15 March 03 / 13:17 according to data.  
**Recovery of mine:** 15 March 03 / 11:00 (local time, ET).  
ATTENTION: There exists a disagreement between reported time of recovery and last recording on sea floor derived from data. The difference is ten records, corresponding to a gap of 2.5 hours between 10:47 and 13:17.  
**End of recording:** 21 March 03 / 10:21 (local time, ET).  
**Remark:** Bow oriented by divers towards North.
  
2. **Mine:** 4 (Seeigel) / No. 342 – **Instrumented Mine F6**  
**Batteries installed:** 07 October 02 / 12.93 V.  
**Measurement cycle:** 15 min.  
**Position:** 27°57.874'N / 83°02.711'W.  
**Water depth:** 12.3 m.  
**Sediment:** Fine sand.  
**Start of recording:** 11 January 03 / 11:47 (local time, ET).  
**Deployment of mine:** 11 January 03 / 18:35 (local time, ET).  
**First recording on sea floor:** 18:47 (local time, ET).  
**Re-orientation of mine:** No information from protocol. Data prove a re-orientation on 12 January 03 / 09:50: Last recording before re-orientation at 09:47 (record # 89). First record after re-orientation at 10:02 (record #90).  
**Last recording on sea floor:** 15 March 03 / 10:47 according to data.  
**Recovery of mine:** 15 March 03 / 11:30 (local time, ET) according to protocol.  
ATTENTION: Between last recording on the sea floor (data) and reported time of recovery exists a gap of two records (missing compared to reported time of recovery).  
**End of recording:** 21 March 03 / 09:55 (local time, ET).  
**Remark:** Bow oriented towards West by divers; Stern light bridge ring did not work, all sensors set to „1“.



3. **Mine:** 7 (Hummer)/ No. 183 – **Instrumented Mine F7**  
**Batteries installed:** 10 October 02 / 12.93 V.  
**Measurement cycle:** 15 min.  
**Ca. Position:** 27°58.103'N / 83°02.948'W.  
**Water depth:** 12.7 m.  
**Sediment:** Coarse sand.  
**Start of recording:** 11 January 03 / 11:46 (local time, ET)  
**Deployment of mine:** 11 January 03 / 18:20 (local time, ET).  
**First recording on sea floor:** 11 January 03 / 18:31 (local time, ET).  
**Re-orientation of mine:** According to protocol re-orientation of mine on 12 January 03 / 14:30-15:00. Data prove a re-orientation on 12 January 03 / ca. 14:40 (last record at 14:31: record #108). First recording after re-orientation at 14:46 (record #109).  
**Last recording on sea floor:** 16 March 03 / 12:31 according to data.  
**Recovery of mine:** 16 March 03 / 12:50 according to protocol.  
**End of recording:** 21 March 03 / 11:57 (local time, ET)  
**Remark:** Bow oriented towards South by divers.
4. **Mine:** 10 (Grundwurm) / No. 186 – **Instrumented Mine F8**  
**Batteries installed:** 07 October 02 / 12.93 V.  
**Measurement cycle:** 15 min.  
**Position:** 27°58.075'N / 83°02.946'W.  
**Water depth:** 12.7 m.  
**Sediment:** Coarse sand.  
**Start of recording:** 11 January 03 / 11:45 (local time, ET).  
**Deployment of mine:** 11 January 03 / 18:05 (local time, ET).  
**First recording on sea floor:** 11 January 03 / 18:15 (local time, ET).  
**Re-orientation of mine:** No re-orientation required.  
**Last recording on sea floor:** 16 March 03 / 12:30 according to data.  
**Recovery of mine:** 16 March 03 / 12:40  
**End of recording:** 21 March 03 / 11:38 (local time, ET)  
**Remark:** Bow oriented towards East.
5. **Mine:** 5 (Sandwurm) / No. 343 – **Instrumented Mine F9**  
**Batteries installed:** 07 October 02 / 12.91 V.  
**Measurement cycle:** 15 min.  
**Position:** 27°58.199'N / 83°03.278'W.  
**Water depth:** 13.2 m.  
**Sediment:** Fine sand.  
**Start of recording:** 11 January 03 / 11:44 (local time, ET).  
**Deployment of mine:** 11 January 03 / 17:29 (local time, ET).  
**First recording on sea floor:** 11 January 03 / 17:29 (local time, ET).

**Re-orientation of mine** From protocol: re-orientation on 13 January 03 / 09:00-09:45. Data prove re-orientation on 13 January 03 / ca. 09:30. Last recording before re-orientation at 09:28 (record #184). First recording after re-orientation um 09:43 (record #185).

**Last recording on sea floor:** 15 March 03 / 16:44 according to data.

**Recovery of mine:** 15 March 03 / 17:04 .

**End of recording:** 21 March 03 / 10:39 (local time, ET).

**Remark:** Bow oriented towards East by divers.

6. **Mine:** 6 (Krabbe)/ No. 182 – **Instrumented Mine F10**

**Batteries installed:** 07 October 02 / 12.91 V.

**Measurement cycle:** 15 min.

**Position:** 27°58.198'N / 83°03.297'W.

**Water depth:** 13.2 m.

**Sediment:** Fine sand.

**Start of recording:** 11 January 03 / 11:40 (local time, ET).

**Deployment of mine:** 11 January 03 / 16:50-17:10 (local time, ET).

**First recording on sea floor:** 11 January 03 / 17:10 (local time, ET).

**Re-orientation of mine** From protocol: re-orientation on 13 January 03 / 09:00-09:45. Data prove a re-orientation on 13 January 03 / ca. 09:30. Last recording before re-orientation at 09:25 (record #184). First recording after re-orientation at 09:55 (record #186). Record #185 can have been during re-orientation.

**Last recording on sea floor:** 15 March 03 / 16:40 according to data.

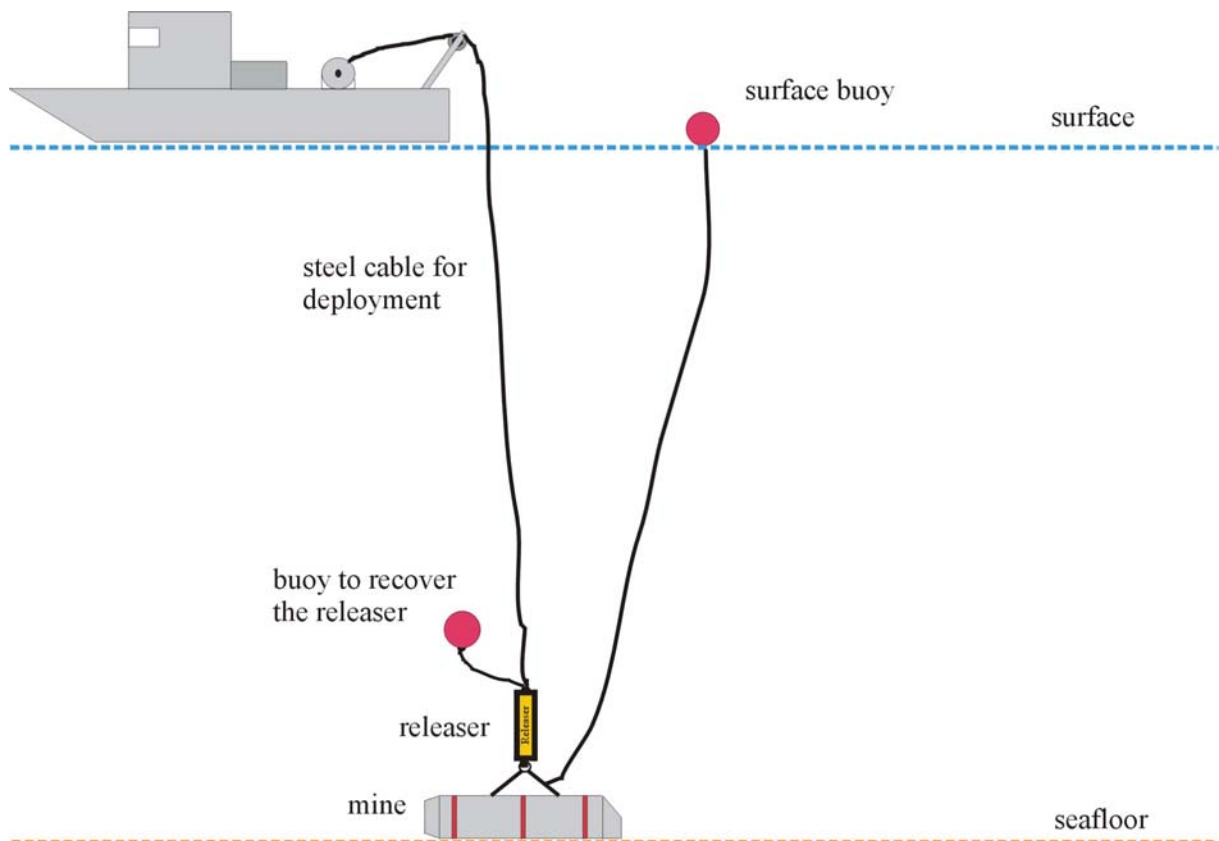
**Recovery of mine:** 15 March 03 / 17:30 .

**End of recording:** 21 March 03 / 11:00 (local time Tampa).

**Remark:** Bow oriented towards North by divers; Check centre of mass – centre of volume offset.!!

Deployment of the mines started at about 16:00 (ET). For deployment they were lowered to the sea floor together with releasers. Then the releaser was released and rose to the surface. An additional rope with a surface float was attached to the mine for the divers. After all mines were deployed divers checked the orientation of the mines by lifting them with lift bags and re-orienting them in North-South and West-East directions. Finally, the surface floats with ropes were taken out.

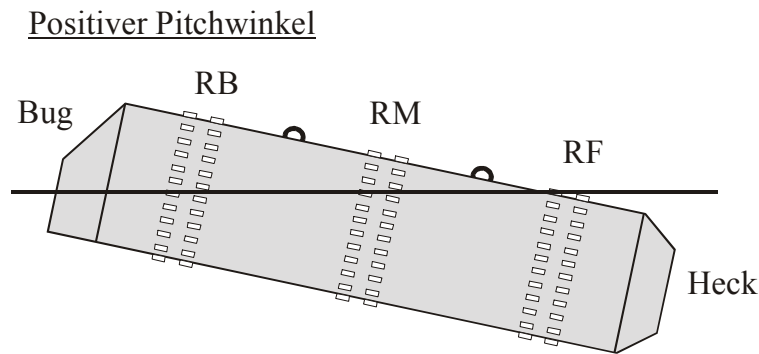
The objects were all connected with a thin parachute rope for easier relocation by divers.



## Appendix 7.

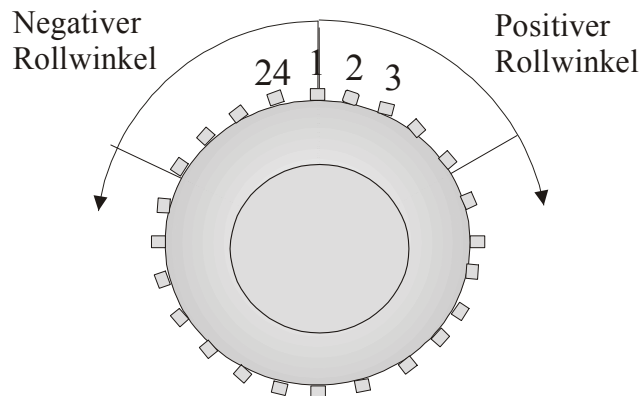
### General Info about FWG's Burial Recording Mines

The FWG Burial Recording Mines (BRM) is used to monitor the burial status of the mine casing. The systems are equipped with three rings of 24 light bridges equally spaced around the mine at  $15^\circ$ . A side view is shown in Figure 1. In addition accelerometers inside monitor the movement of the mine and allow to calculate the Pitch and Roll. The light bridges (light emitter and receiver) are in small housings (in German called "Knaggen") welded onto the mine casing. The BRMs have a length of 170 cm, and a diameter of 47 cm. Their weight in air is 550 kg, in water 460 kg.



**Figure 1:** Side view of a BRM with positive pitch angle. The bow (Bug) is the tapered end of the mine, the stern (Heck) is symmetrical. The three rings are named RB, RM, and RF.

Figure 2 gives a cross section through the BRM and explains how the numbering is defined.

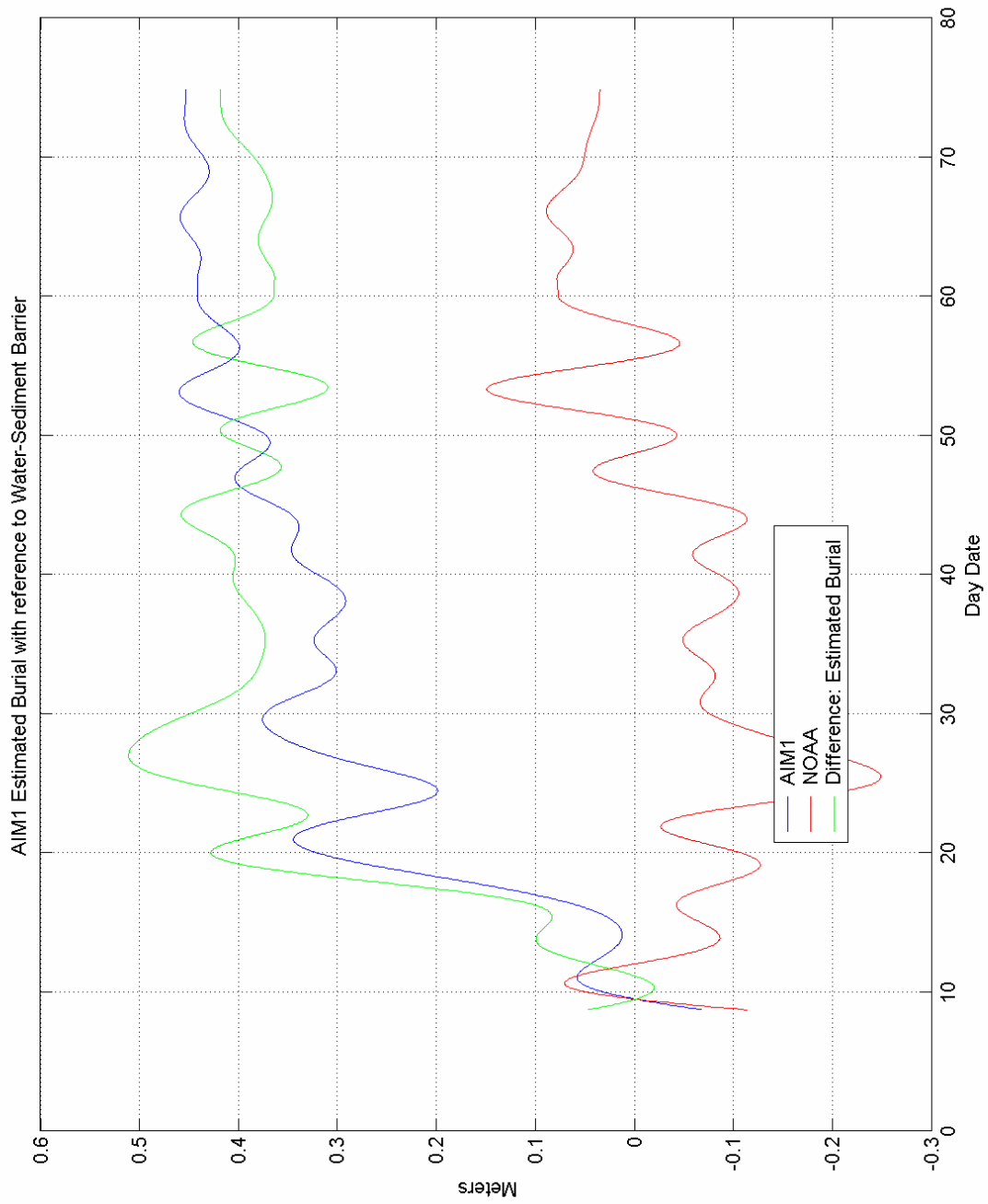


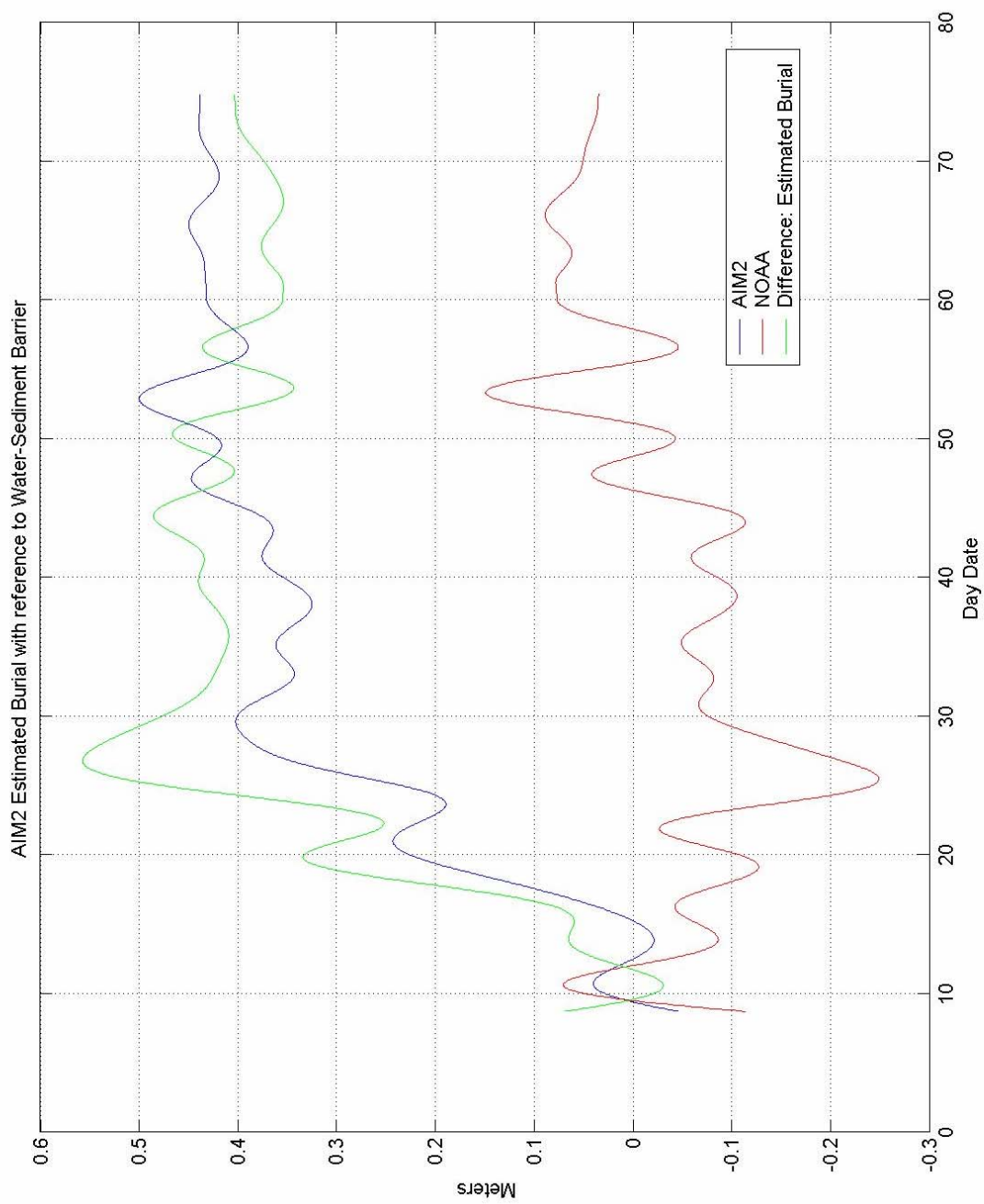
**Figure 2:** Cross section of a BRM and indication of positive and negative roll when looking from the stern of the mine to the bow.

At pre-set intervals (15 minutes for the IRB 03 experiment) light is emitted for a short moment and received on the other side of the light bridge. In case sediments interrupt the

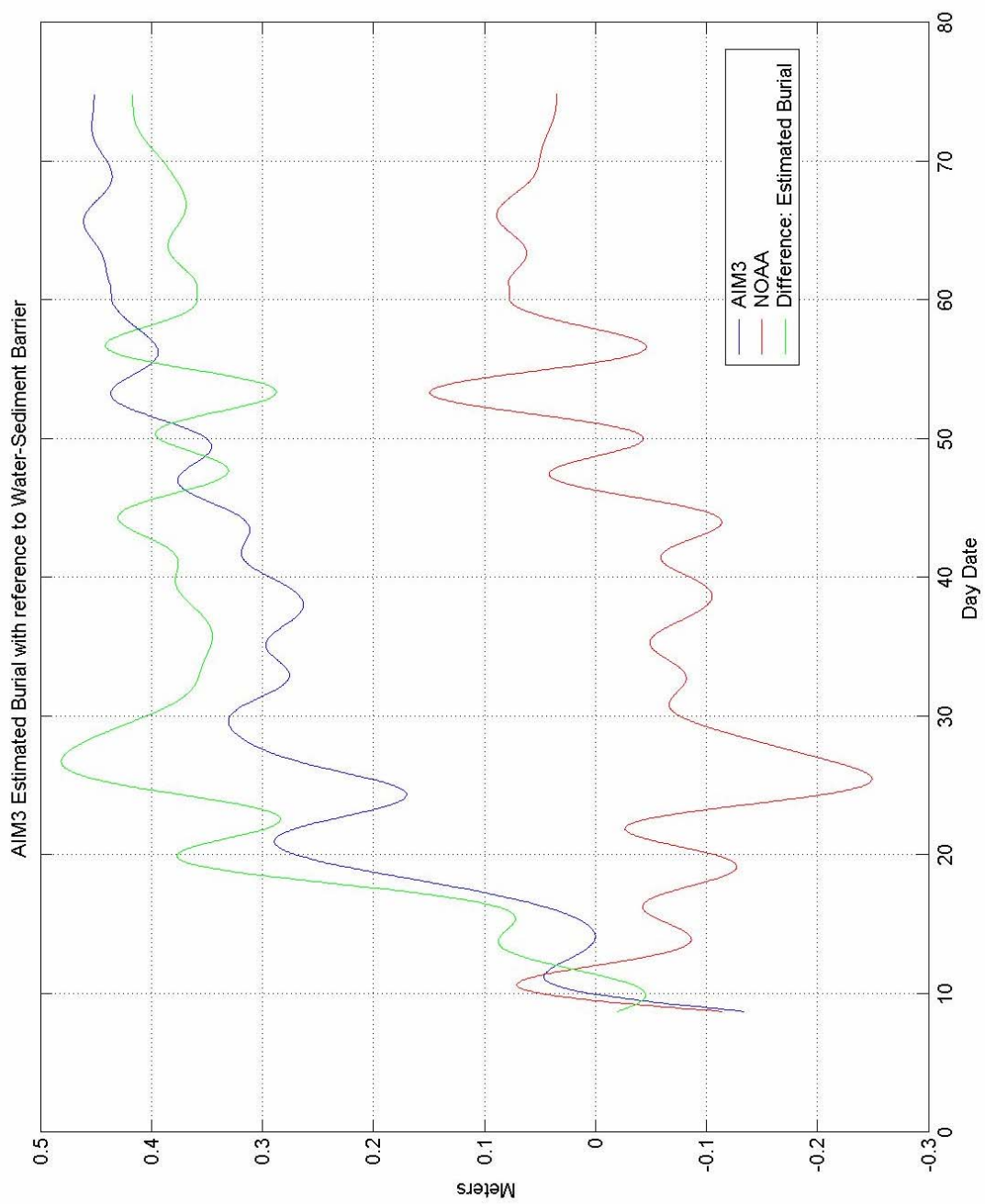
light bridge (it is buried) a "1" is recorded. If light can pass and is recorded with the receiver, a "0" is recorded. This allows to determine how many light bridges are blocked by sediment. However, some light bridges were blocked by barnacles sitting on the windows of the light bridges. Fortunately, these could easily be identified after recovery of the mines by visual inspection and comparison with the records. Also helpful is the fact that barnacles will only settle at those light bridges which are not covered by sediment. The data processing was thus relatively easy.

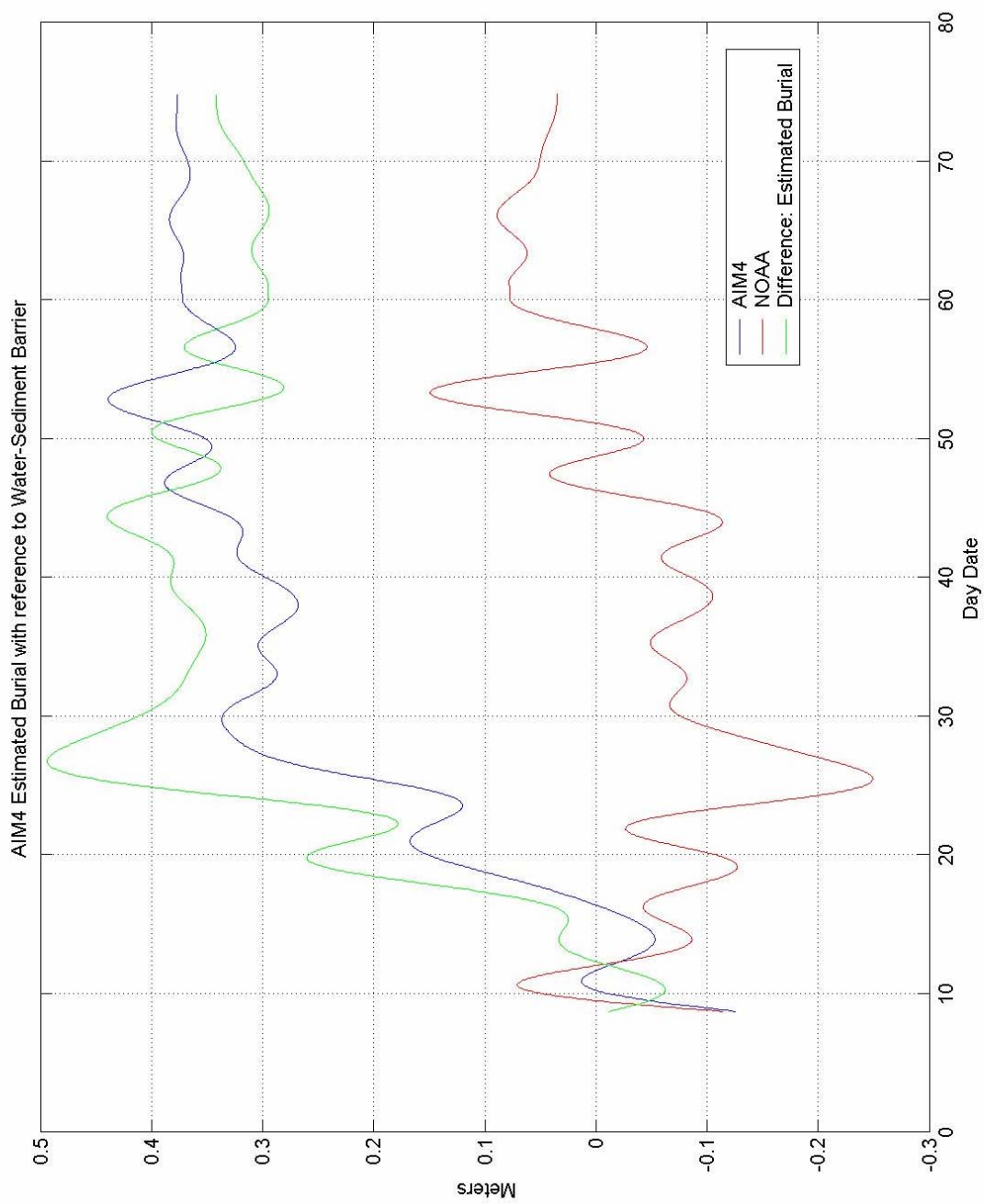
Appendix 8. AIMS Data



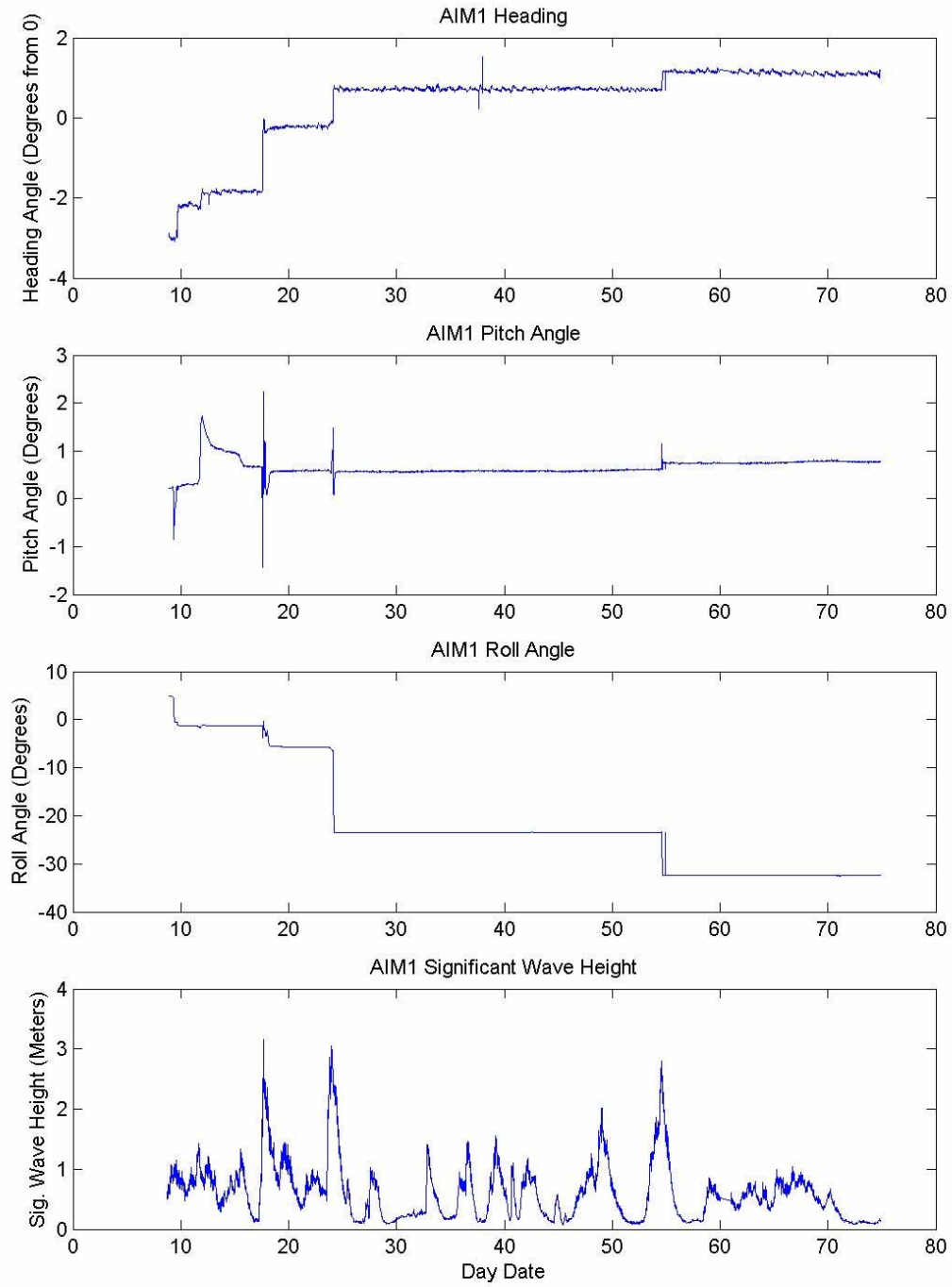


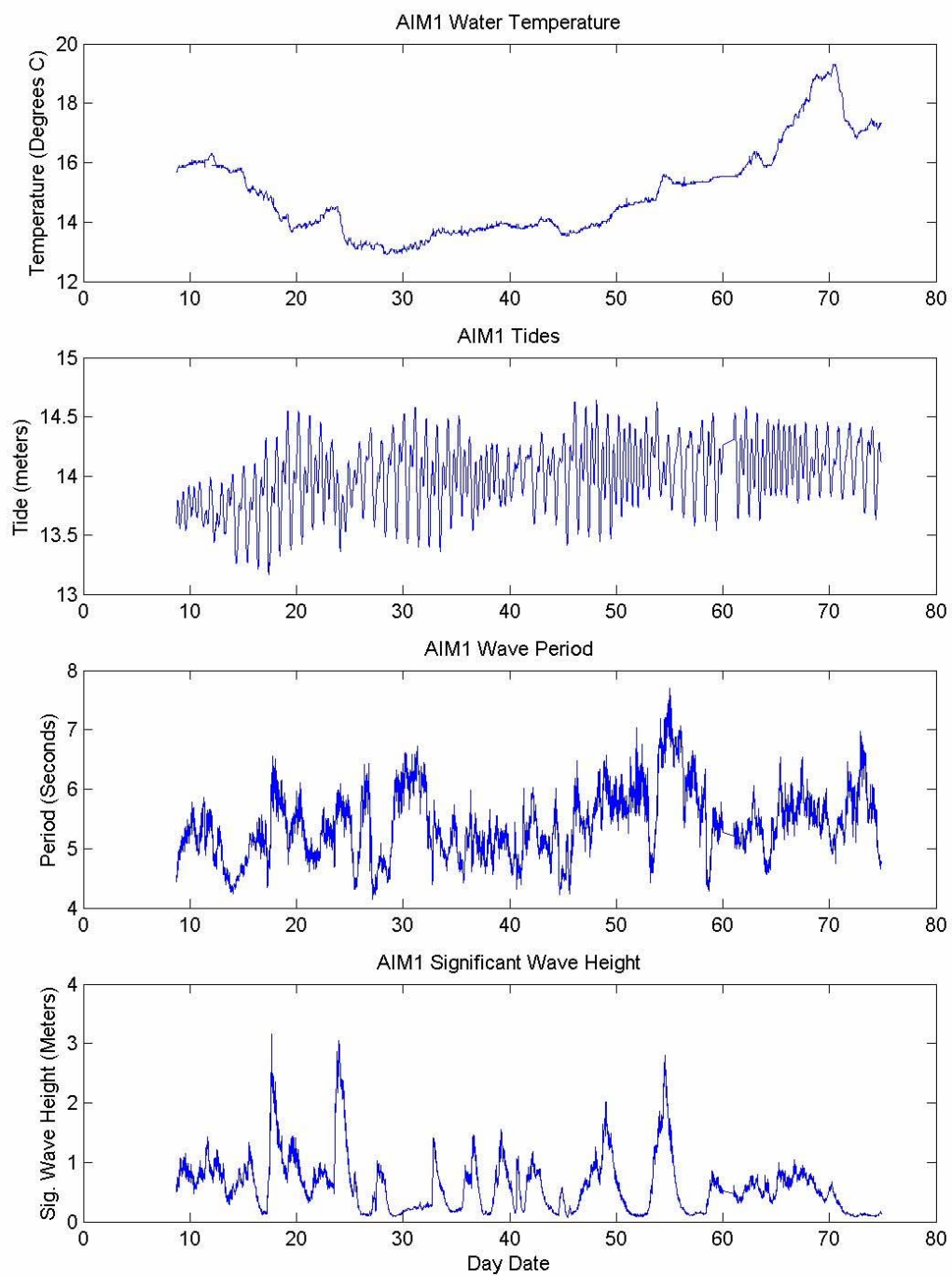


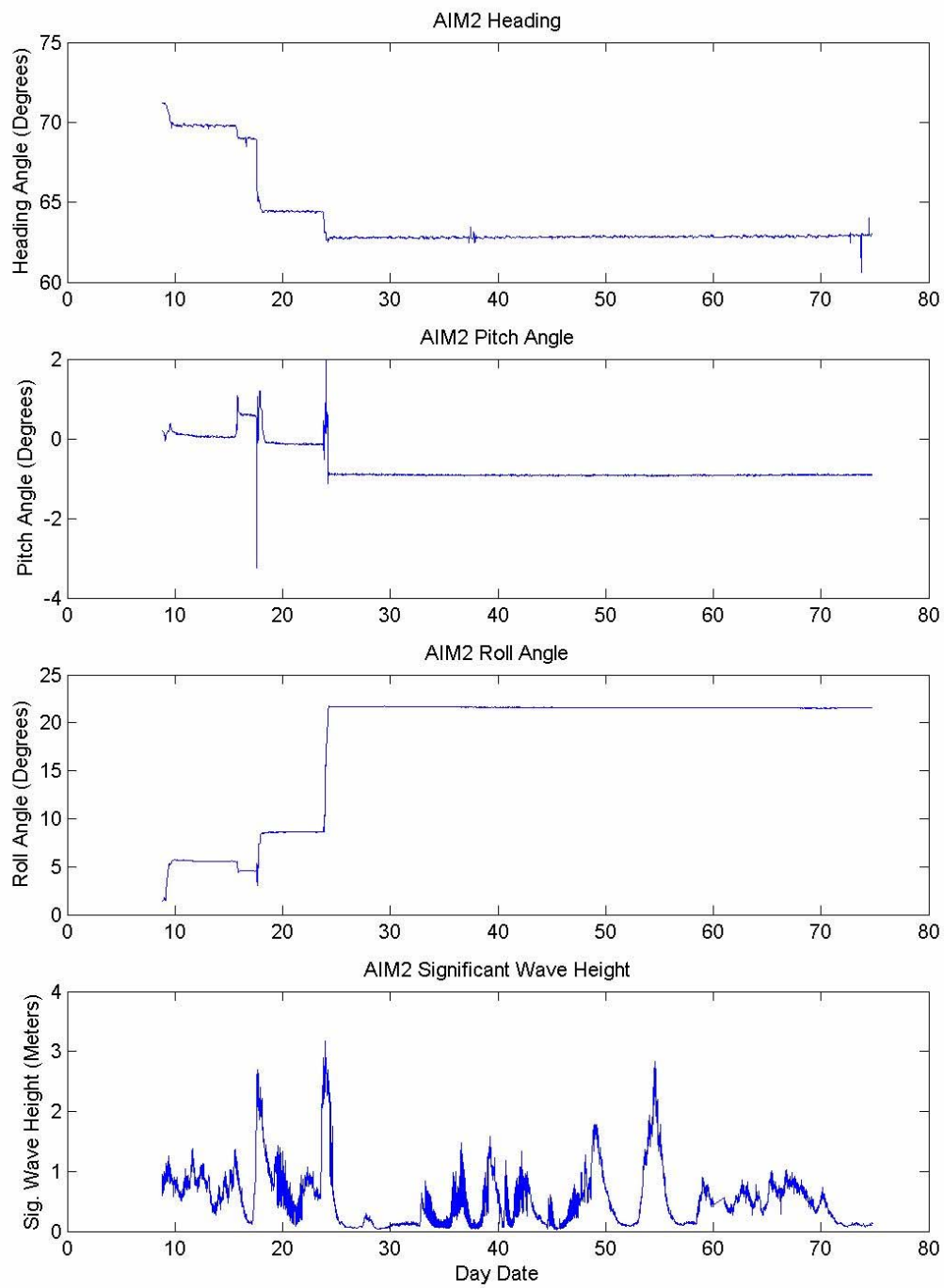


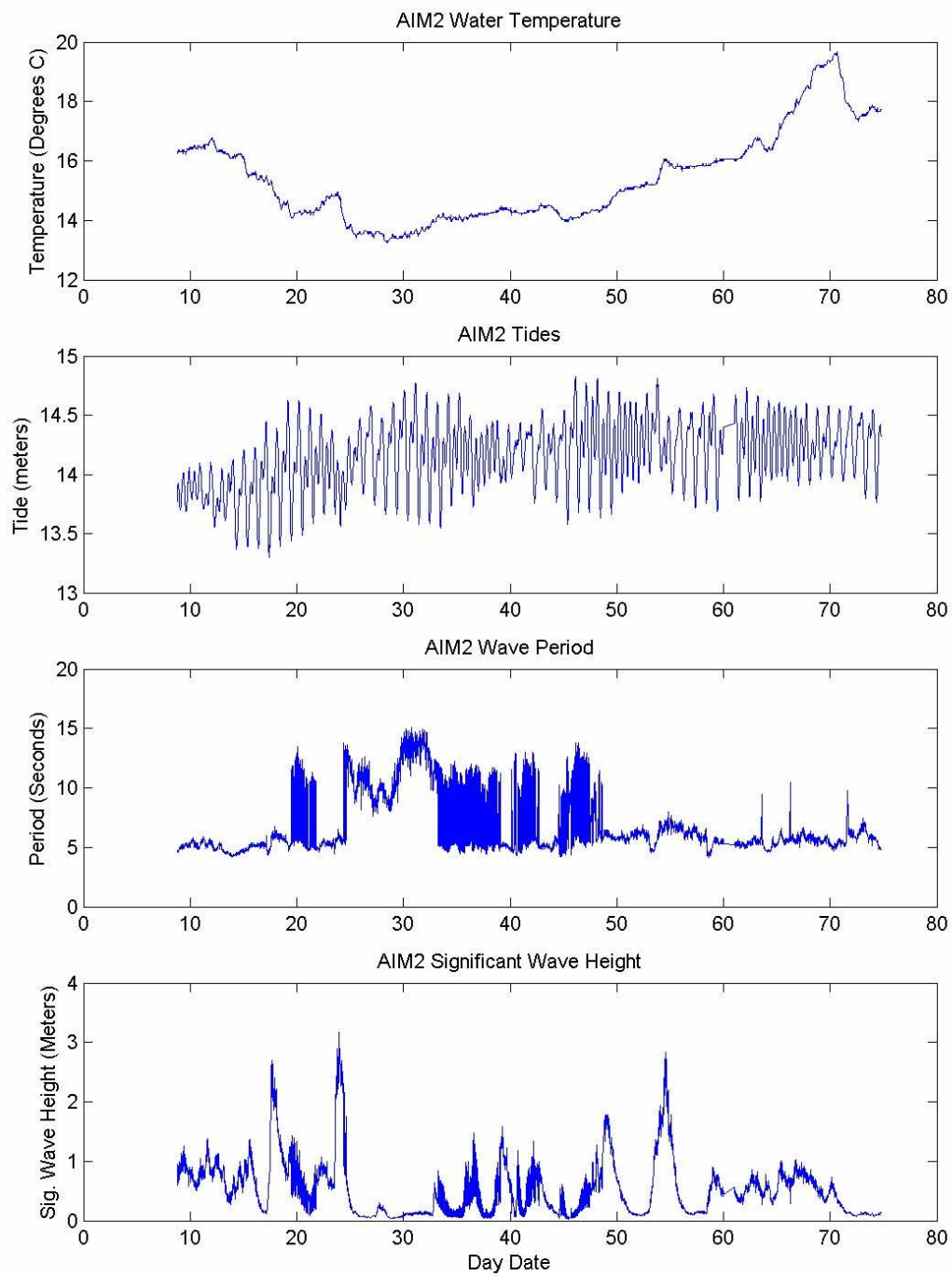


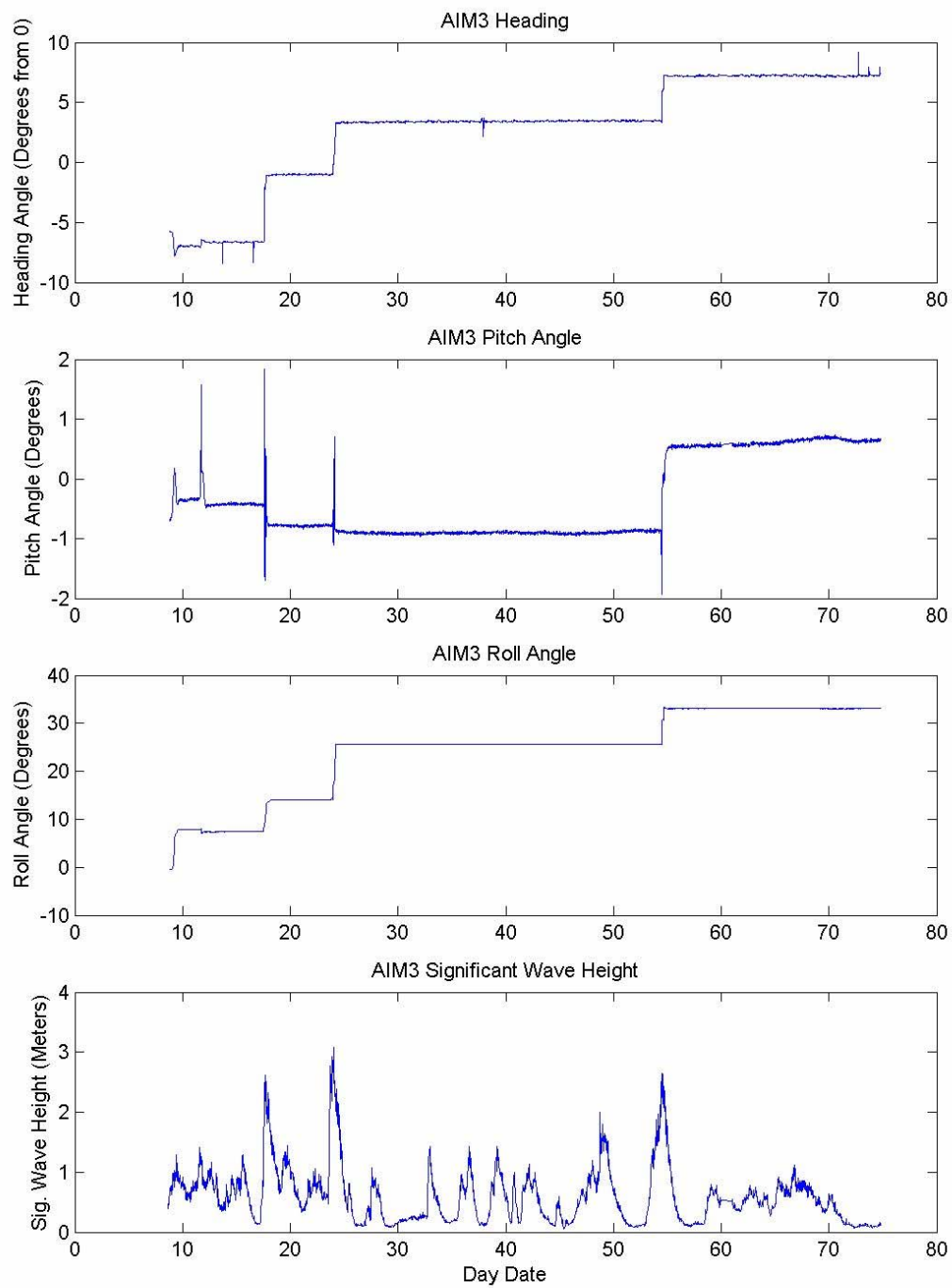
*Appendix 9. AIMS Orientation and Environmental Data*



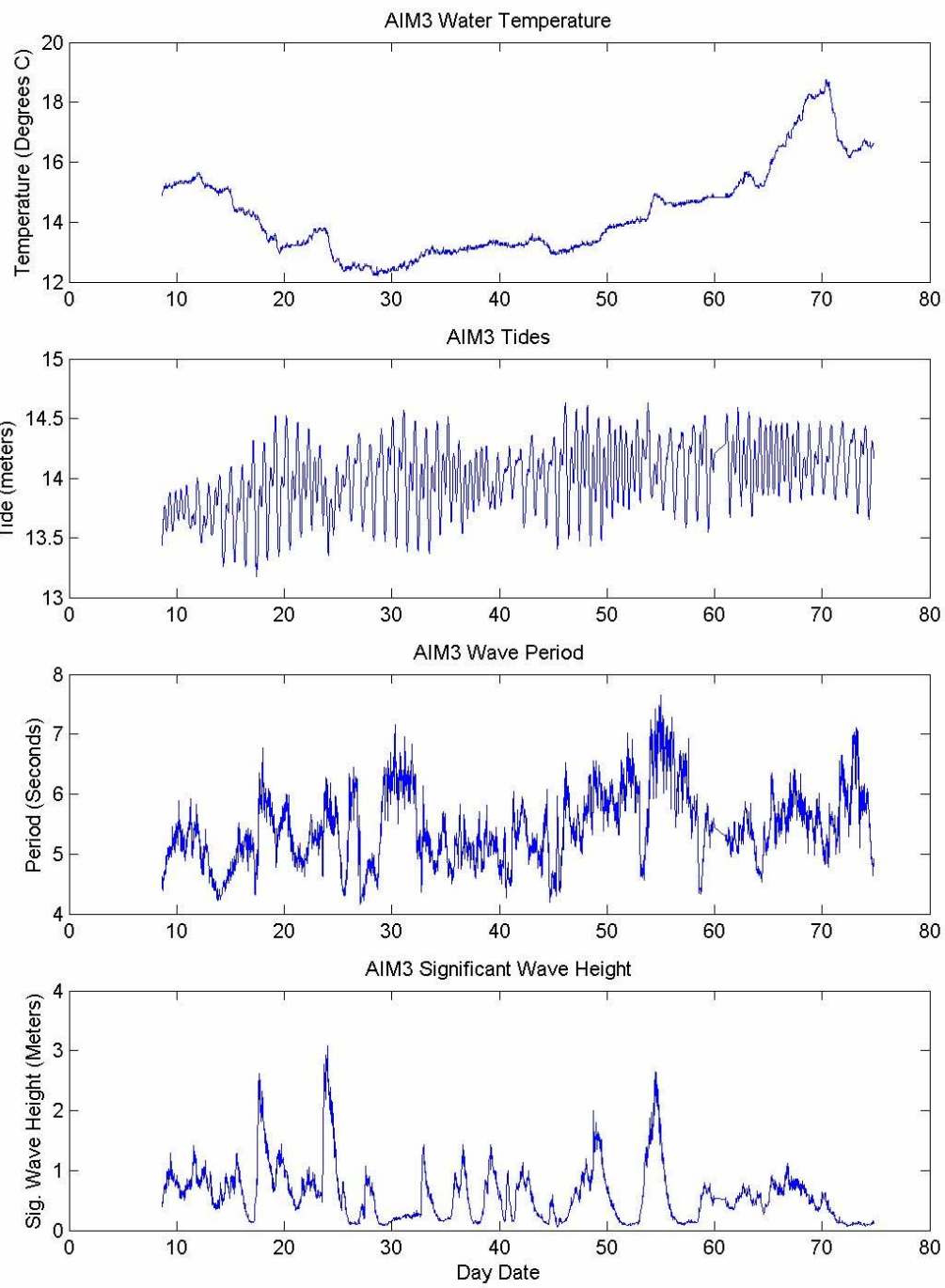


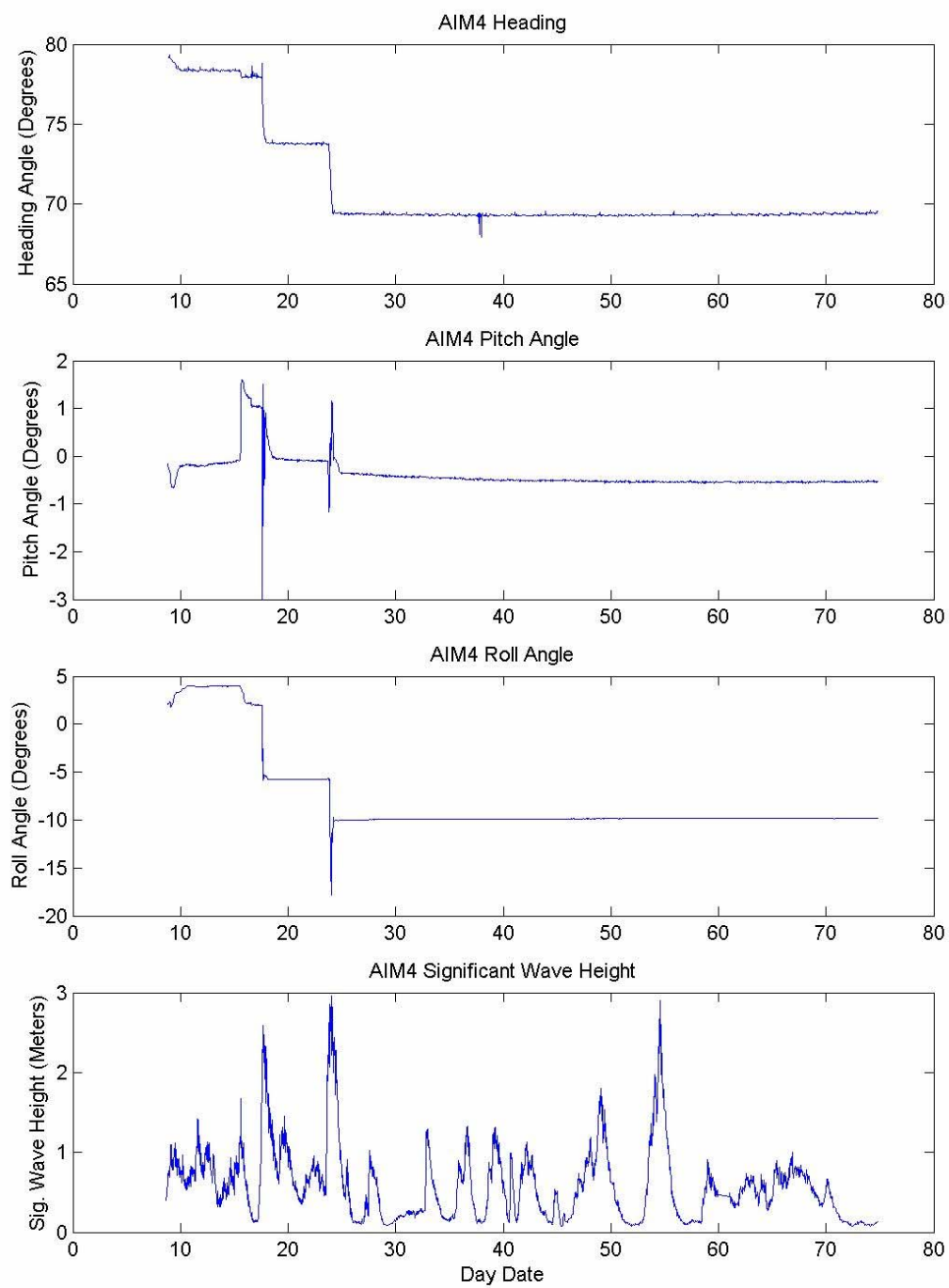


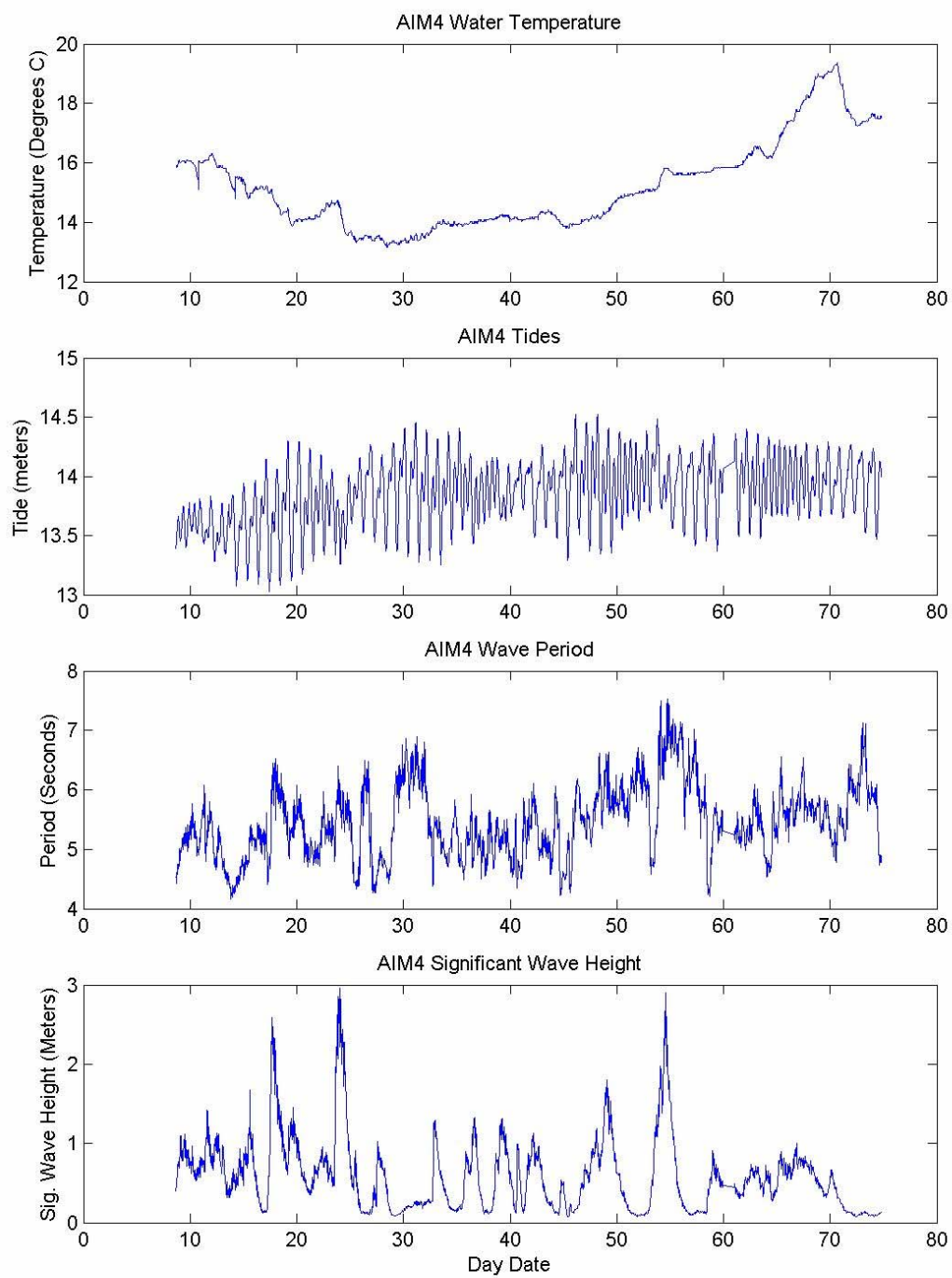












# FWG Mines 11 Jan - 15 March 2003

